DOCUMENT RESUME

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SPONS AGENCY	Illinois State Board of Education, Springfield. Dept. of Adult, Vocational and Technical Education.
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IDENTIFIERS	*Illinois

ABSTRACT

Activities and procedures by which secondary vocational education can be designed to prepare students for entrance into new technology programs or employment were developed in the Illinois Employment for Technology Education (ETE) project during the 1983-84 school year. These activities included the following: (1) formation of a high technology consortium, (2) development of a survey instrument to identify high technology skills and knowledge required by employers and analysis of the results of the survey, (3) analysis of the labor market for programs selected in the ETE project, (4) review of existing vocational curriculum and equipment on hand, (5) conducting curriculum articulation meetings with feeder districts and local community college staff, (6) development of a competency-based vocational curriculum for secretarial and machine shop programs and identification of equipment requirements for them, and (7) identification and implementation of alternative types of staff inservice training required of vocational staff involved in the ETE project. The bulk of the document contains the materials developed during the project: competency lists and a curriculum outline for a secretarial/word processing occupations program; a machine shop task list, along with related materials such as student learning guides; staff development activities; an instructional equipment list; employer/employee survey results; and publicity (news clippings). (KC)

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ED246237

Illinois Education
for Technology
Employment Project

Project Staff

Administrative:

Richard W. Glogovsky
Project Director

Mary E. Taylor
Project Secretary

Consultants:

Steve Gurevitz
Daumants Hazners
Jerry Digilio
Jan Robinson
Mike Anderson
Jerry Gudauskas
Will Pouler
Kay Harned
Ray Snider
Melvin Whitmer
Ron Hassan
Jeff Yordy

Illinois
State Board of
Education

Walter W. Naumer
Chairman

Donald G. Gill
State Superintendent
of Education

Department of Adult,
Vocational and
Technical Education

Research and
Development Section

July 1984

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Lake County Area Vocational Center
19525 West Washington Street
Grayslake IL 60030

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GENERAL INFORMATION

Final Report Abstract

Expenditure of Funds

Paid Participants in Activity

Resource Listing

Major Accomplishments &
Significant Findings

A. Final Report Abstract Format

Official Project Title:
Illinois Education for Technology Employment Project
Department of Adult, Vocational and Technical Education Funding Agreement Number:
R-99-14-X-0313-499
Project Director:
Richard W. Glogovsky
Funded Agency:
Lake County Area Vocational Center
Location of Funded Agency:
19525 W. Washington Street, Grayslake, Illinois 60030
Time Period Covered:
July 1, 1983 - June 30, 1984

Major Accomplishments of the Project:

SEE ATTACHED SHEET

Potential Impact on Vocational Education:

SEE ATTACHED SHEET

Products Delivered: (Indicate titles, types, quantity, recipients and date of delivery)

Copies of the final project report were delivered to the Illinois State Board of Education, Department of Adult, Vocational and Technical Education by July 31, 1984. In addition, copies of Secretarial Office Occupations curriculum including sample learning guides were completed and delivered to Springfield.

Accomplishments

Activities and procedures by which secondary vocational education can be designed to prepare students for entrance into new technology programs or employability were developed in the ETE project during the 83-84 school year. Those activities included:

a. High Tech Consortium formation

b. Development of survey instrument to identify high tech skills and knowledge required by employers

c. Analyze the results of the employer/employee employment survey

d. Conduct labor market analysis on programs selected in ETE project (Machine Shop - CNC)

e. Review existing vocational curriculum and equipment on hand

f. Conduct curriculum articulation meetings with feeder districts and local community college staff

g. Develop competency-based vocational curriculum for Secretarial and Machine Shop programs and identify equipment requirements for the same.

h. Identify and conduct alternate types of staff in-service training required of vocational staff involved in ETE project.

Procedures (Planning Phase):

A. In July, 1983, the Project Director and technical assistance staff will meet with ISBE/DAVTE representatives to identify project direction and specific activities to be accomplished by those involved. (Objective 1)

A number of meetings (8-10) were held with technical assistance staff and DAVTE consultants during the 83-84 school year. As a result, appropriate activities were identified and accomplished.

B. In July, 1983, the Project Director will meet with identified consultants to identify specific activities which need to be done to insure success of the project. (Objective 1)

. Weekly meetings were held with project consultants in order to give direction and insure success of the project.

C. In July, 1983, the Project Director will form and meet with an advisory (consortium) committee comprised of members from the College of Lake County, local business and industry and explain the objectives of the project as well as receiving input from the members concerning the same. (Objective 1)

An advisory (consortium) committee was formed and was used as a sounding board concerning new technology curriculum development and integration into existing vocational programs.

D. In July, 1983, the Project Director, with assistance from selected consultants, will develop a survey instrument which will be used as a vehicle to identify those high tech skills required by representatives in the high tech industries. (Objective 1)

An employer/employee survey instrument was developed and used to identify those high tech skills required by employees in business and industry. A copy of that survey is included in the final report.

E. In August, 1983, the Project Director and staff will collect and analyze the results of the employers' survey in order to identify those important high tech skills which should be included in secondary vocational programs as well as those skills appropriate at the community college level.

The employers' survey was completed by employees of over 75 different businesses and industries in Lake County. The results were tallied and used to:

(1) Identify specific skills required of employees in various high tech occupations.

(2) Identify specific high tech instructional equipment appropriate at the vocational center level.

(3) Identify specific basic skills (math, science, and English) required of individuals involved in specific occupations. (Survey results are included in the appendix of this report)

F. During December, 1983, the DAVTE technical assistance staff will review existing high tech curriculum and equipment lists already developed and identify specific materials useful to the project. (Objective 1)

Technical assistance meetings were held with Scarborough throughout the 83-84 school year. Curriculum development workshops on Computer Aided Drafting, Electronics and Robotics and other program areas were made available through their efforts. LCAVC staff took advantage of these workshops to update their technical skills and prepare for the integration of technology curriculum into their programs.

Procedures (Development Phase):

A. From October through December, 1983, the selected consultants along with local industrial staff assistance, will utilize existing school and community resources to examine existing vocational program curriculum and identify the type of competency-based advanced technology curriculum which could be integrated into the same. The RFP technical staff will also be utilized in this activity. (Objective 2)

LCAVC consultants, Jan Robinson, Steve Gurevitz, Jerry Digilio, Will Pouler and advisory committee members for both Secretarial and Machine Shop program areas met on six occasions to review existing program curriculum, and suggest new technical curriculum additions.

Articulation meetings were held with feeder district Secretarial and Machine Shop staff as well as with staff at the College of Lake County. The meetings helped to identify task list and supportive instructional equipment.

B. From January through March, 1984, the Project Director, staff consultants and RFP technical assistance consultant, will develop a suggested high technology competency-based program curriculum/s including equipment and facility needs for each based upon input from business and industry, community college staff, student surveys and advisory committee recommendations. (Objective 2)

A competency-based curriculum on word processing, including task lists and sample learning guides, was developed during the 1983-84 school year. Also, in the Machine Shop program area, a task list and sample learning guides were developed. Copies of those materials are included in this final report.

C. In April and May, 1984, the Project Director, staff consultant with assistance from the RFP technical assistance staff, will identify alternate types of staff in-service training required in order to provide them with the skills required for high technology program instruction. (Objective 2)

Staff in-service training has been ongoing for both the Secretarial and Machine Shop staff as well as all LCAVC and feeder district staff. Specific subject content workshops have been selected for those staff involved in the ETE project. The identification of alternate types of training programs has been identified by Dr. Strandberg at Eastern Illinois University and will be utilized during the 84 - 85 school year.

Potential Impact on Vocational Education:

The high tech program planning/development project has become a vehicle which can be used to help vocational centers and comprehensive high schools in program planning and staff development in preparing students for employment or advanced technology training at the community college level.

The results of this project will be helpful to high schools, community colleges, and universities in developing sequential training paths for students. It will also assist teachers in preparating for the integration of math, science and high tech activities in their program areas.

In addition to the Statement of Impact as outlined in the project proposal, it is anticipated that additional training sites (business and industry) will be identified and utilized by LCAVC staff in helping students gain additional high technology skills.

B. Expenditure of Funds:

There were no major discrepancies between the Illinois State Board of Education/Department of Adult, Vocational and Technical Education funding agreement amount and actual expenditures claimed for the project.

C. Paid Participants in Activity:

Richard W. Glogovsky, Project Director
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

Ten years of experience in curriculum development/research and vocational center administration and twenty-four years of total experience in vocational education.

Mary Taylor and Linda Weidman
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

Ten years of experience as a secretary and 1 year as project assistant.

C. Paid Participants in Activity: (continued)

Steve Gurevitz, Project Consultant (Machine Shop)
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

Ten years of experience as a vocational teacher and fifteen years work experience as a machinist.

Daumants Hazners, Project Consultant
College of Lake County
19351 W. Washington Street
Grayslake, Illinois 60030

Eight years of junior college Applied Science Administration and ten years of experience as a Civil Engineer. Presently Chairperson of Engineering, Mathematics and Physical Science Division at the College of Lake County.

Jerry Digilio, Project Consultant
College of Lake County
19351 W. Washington Street
Grayslake, Illinois 60030

Eleven years of experience as a vocational teacher, four years experience in the Peace Corps and four years of work experience as a machinist.

Jan Robinson, Project Consultant (Secretarial Office Occupations)
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

Eleven years of experience as a vocational teacher and four years of experience in the secretarial work world.

Mike Anderson, Project Consultant (Vocational Coordinator)
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

Five years of experience as Vocational Coordinator and a total of fourteen years guidance/vocational education.

Jerry Gudauskas, Project Consultant (Director)
Lake County Career Guidance Consortium
19525 W. Washington Street
Grayslake, Illinois 60030

Eight years of experience as Career Guidance Director in Lake County and twenty years of experience in Vocational/Career Guidance work.

Will Pouler, Project Consultant
24101 - 119th Street
Trevor, Wisconsin 53179

Twenty-five years of experience as Training Director in OMC Corp. and author of several texts on Blueprint Reading and Die Casting.

C. Paid Participants in Activity: (continued)

Kay Harned, Project Consultant
Illinois Labor Market Information Service
Center for Governmental Studies
Northern Illinois University
DeKalb, Illinois 60115

Ten years of experience in the area of social work and labor market analysis.

Ray Snider, Project Consultant (Electronic Equipment Repair)
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

Ten years of experience as a vocational instructor and twenty years experience of electrical instructorship in the U.S. Navy.

Melvin Whitmer, Project Consultant (Industrial Electrical Maintenance)
Lake County Area Vocational Center
19525 W, Washington Street
Grayslake, Illinois 60030

Seven years of experience as a vocational instructor (2 DeVry and 5 LCAVC) and fifteen years of work experience in electronic equipment repair.

Ron Hassan, Project Consultant (Air Cond, Refrigeration & Heating)
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

Four years of experience as vocational instructor and twelve years of experience as an air conditioning/refrigeration repair person.

Jeff Yordy, Project Consultant (Horticulture)
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

Three years of experience as a vocational instructor and two years of work experience as a horticulturist.

D. Resource Listing:

1. Handbook for Developing Competency-Based Training Program by William E. Blank, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1982, (1 copy).

2. Directory of Major Employers, Waukegan/Lake County Chamber of Commerce, 414 N. Sherican Rd., Waukegan, IL 60085, 1984, (1 copy).

3. Lake County Private Industry Council Business Directory, Lake County CETA Program, 307 Washington St., Waukegan, IL 60085, 1984, (1 copy).

4. Updating Teachers for Tomorrow's Technology: Programs and Practices, the National Center for Research in Vocational Education, National Center Publications., Box U, 1960 Kenny Rd., Columbus, Ohio, 43210 1983, (1 copy).

5. Hydraulics and Pneumatic Manual, Robotics Applications Manual, Industrial Sensor Fiber Optics Handbook and Student Activities Manual, Rubino and Bondi, Robotics Systems Inc., 401 N. Salem Ave., Arlington Heights, IL 60005, 1981, (1 copy of each).

6. Learning Styles: Applications in Vocational Education, by C. Knaak, the National Center for Research in Vocational Education, National Center Publications, Box C, 1960 Kenny Rd., Columbus, Ohio, 43210, 1983, (1 copy).

7. Numerical Control for Machining, Numerical Control Milling and Drilling, Numerical Control Turning, by Ted L. Pahde, Intext, 315 Post Road West, Westport, CT 06880, 1981, (1 copy of each).

E. Major Accomplishments and Significant Findings of the Project

Objective and Accomplishments

1. By July 31, 1983 form a High Tech Consortium with selected members from business, industry, and education and seek input concerning suggestions for high tech programs, skills, knowledge designed for integration into the vocational curriculum at the secondary level.

Accomplishment

A High Tech Consortium composed of members from business, industry and education was formed and organized during the 1983-84 school year. This committee assisted Lake County Area Vocational Center in the ETE project by making suggestions in reference to new technology skills and knowledge required for employability. The committee also made suggestions identifying new subject content which is to be integrated into the vocational curriculum at Lake County Area Vocational Center.

2. To plan and develop by June 30, 1984, a series of alternatives by which vocational education programs at the secondary school level can be designed to prepare students to enter high technology programs at community college level.

3. Intended effects:

As a result of the project, many teachers and adminstrators became more aware of the project objectives and understood what effect the results would have on vocational education in the state.

Many feeder district and community college staff and administrators supported the ETE project and decided to articulate/cooperate with LCAVC. Both the community college and several feeder districts (Waukegan, Zion-Benton, Stevenson, Antioch and Lake Forest) began to develop curriculum and select appropriate high tech instructional equipment for their drafting, secretarial and machine shop programs.

4. Strategies for new technology curriculum development and implementation.

   A. Presentation to:

      1. LCAVC Board of Control
      2. LCAVC Staff
      3. LCAVC Cordinating Committee
      4. College of Lake County Voc. Administration
      5. LCAVC General Advisory Council
      6. LCAVC ETE Consortium
      7. Lake County Career Guidance Consortium
      8. Mid-America Conference, CBVE

   B. Various LCAVC and feeder district staff were involved in a number of workshops related to subjects dealing with:

      a. Computer Assisted Drafting (CAD)
      b. Word Processing
      c. Micro-Computers
      d. Machine Shop (CNC)
         See attached report

5. Particular Project Activities

A variety of dissemination and articulation activities relative to the ETE project were conducted with the following groups:

   a. ETE Consortium - meetings on a monthly basis
   b. ETE Consultants - weekly meetings
   c. LCAVC Board of Control - project updates given as required
   d. Northwestern University (Dr. Noll and staff) quarterly meetings
      lab technology

e. Articulation Meetings with:
    College of Lake County (Daum Hazners and staff)
    Feeder district Business Education and Drafting staff
    Vocational Directors
    Other ETE Site Directors
f. LCAVC Occupational Program Advisory Committeee
g. Extended Campus contact persons.
    (See report on Extended Campus activities)

6. List of names and adresses and job titles of the participants is attached.

7. A composite of the completed activity wasn't developed in a report format. Presentations, workshops, and articulation meetings were held during the course of the 83-84 school year. Agendas and minutes, as well as reports, have all been submitted in the quarterly reports. Copies of the same are available upon request.

8. The materials presented (employer survey forms, program task lists, curriculum outlines, instructional equipment, and student learning guides) were enthusiastically accepted by the persons attending the presentations. Input from committees and feeder district staff helped to validate the ETE project objectives, direction, and outcomes.

9. The successes derived from the activity are that the teachers at Lake County Area Vocational Center, feeder districts, and the College of Lake County have begun to update their existing vocational curriculum and integrate new technology concepts in their programs.

New state-of-the-art instructional equipment has been identified by the ETE project and is now being purchased by some of the feeder districts as well as the College of Lake County. Most importantly, a cooperative climate has developed between the districts, LCAVC, and community college and a systematic approach for vocational education is being developed.

10. Copies of project materials developed are attached to this report and others have been sent and included in the quarterly reports.

PROJECT PARTICIPANTS

Articulation Meetings

Training Workshops

Extended Campus Training Sites

LAKE COUNTY AREA VOCATIONAL CENTER
BOARD OF CONTROL
1984-85

CHOOL TRICT	NAME & TITLE	PHONE	ADDRESS
12	Dr. Duane Andreas, Superintendent Johnsburg Community Unit School	815/ 385-6916	2117 W. Church Street McHenry, Illinois 60050
60	Dr. Donald Torreson, Superintendent Waukegan Community Unit School	336-3100	1201 N. Sheridan Road Waukegan, Illinois 60085
95	Mr. Philip H. McDevitt, Superintendent Lake Zurich Community Unit School	438-2831	66 Church Street Lake Zurich, Illinois 60047
113	Dr. James H. Warren, Superintendent Highland Park - Deerfield High Schools	432-6510	1040 W. Park Ave. West Highland Park, Illinois 60035
115	Dr. Robert H. Metcalf, Superintendent Lake Forest Community High School	234-3600	1285 N. McKinley Lake Forest, Illinois 60045
116	Mr. Clifton A. Houghton, Superintendent Round Lake Community Unit School	546-5522	316 S. Rosedale Court Round Lake, Illinois 60073
117	Mr. Warren Polley, Superintendent Antioch Community High School	395-1421	1133 S. Main Street Antioch, Illinois 60002
118	Dr. Darrell Dick, Superintendent Wauconda Community Unit School	526-6611	555 N. Main Street Wauconda, Illinois 60084
120	Mr. Wayne Bottoni, Superintendent Mundelein Consolidated High School	949-2242	1350 W. Hawley Street Mundelein, Illinois 60060
121	Dr. Paul A. Rundio, Superintendent Warren Township High School	662-4363	500 N. O'Plaine Road Gurnee, Illinois 60031
123	Mr. William Snodgrass, Superintendent North Chicago Community High School	578-7400	1717 - 17th Street North Chicago, Illinois 60064
124	Mr. Lee D. Miller, Superintendent Grant Community High School	587-2561	285 E. Grand Avenue Fox Lake, Illinois 60020
125	Dr. Milton R. Herzog, Superintendent Adlai E. Stevenson High School	634-4000	Illinois Route 22 Prairie View, Illinois 60069
126	Dr. David H. Cox, Superintendent Zion-Benton Township High School	746-1202	1606 W. 23rd Street Zion, Illinois 60099
127	Dr. Griff Powell, Superintendent Grayslake Community High School	223-8621	400 N. Lake Street Grayslake, Illinois 60030
128	Dr. Donald Gossett, Superintendent Libertyville Community High School	367-3159	708 W. Park Avenue Libertyville, Illinois 60048
157	Mr. Ron Erdmann, Superintendent/Prin. Richmond-Burton High School	815/ 678-7211	10006 Main Street Richmond, Illinois 60071
---	Mr. William L. Thompson, Regional Superintendent of Schools, Lake County	689-6313	Room A904 County Building Waukegan, Illinois 60085

LAKE COUNTY AREA VOCATIONAL CENTER
1983-84
High Tech Consortium

Susan Croy or Ralph Edwards
Abbott Laboratories
Abbott Park
North Chicago IL 60064
937-5404 or 937-6100

Jerry Digilio, Coordinator
Ind. Skill. Craft Trng. Prog.
College of Lake County
19351 W. Washington St.
Grayslake IL 60030
223-6601

Thomas Erekson, Coordinator
Off. for Voc. Tech & Career Educ.
Northern Illinois University
155 Gabel Hall
DeKalb IL 60115
815/753-1306

Joe Fielding, Instructor
Wauconda High School
555 North Main St.
Wauconda IL 60084
526-6611

Ron Getz
Bran & Lubbe Inc.
512 Northgate Parkway
Wheeling IL 60090
520-0700

Jerry Gudauskas, Exec. Director
Lake County Career Guid. Consortium
Lake County Area Vocational Center
19525 W. Washington St.
Grayslake IL 60030
223-6681

Steve Gurevitz, Instructor
Machine Shop
Lake County Area Vocational Center
19525 W. Washington St.
Grayslake IL 60030
223-6681

Daumants Hazners, Associcate Dean
Eng. Math & Physical Science
College of Lake County
19351 W. Washington St.
Grayslake IL 60030
223-6601

Ralph E. Lambrecht
Corporate Director of Service
Outboard Marine Corporation
3145 Central Avenue
Waukegan IL 60085
689-6200

Mike McEvoy, Manager, Design Drafting,
Micrographics & CAD/CAM
Travenol Laboratories
P.O. Box 490
Round Lake IL 60073
546-6311

Dr. Hans Noll
Professor of Molecular Biology
2665 Orrington Avenue
Evanston IL 60201
492-7329(b) 866-9796(H)

John O'Gorden
Curriculum Developer, Naval Education
Building 90
Great Lakes IL 60088
688-4697

Raymond Snider, Instructor
Electronic Equipment Repair
Lake County Area Vocational Center
19525 W. Washington St.
Grayslake IL 60030
223-6681

Melvin Whitmer, Instructor
Industrial Electrical Maintenance
Lake County Area Vocational Center
19525 W. Washington St.
Grayslake IL 60030
223-6681

John Wilson, Mgr, Compensation Benefits
Cherry Electric
3600 Sunset Avenue
Waukegan IL 60085
662-9200

Jeff Yordy, Instructor
Ornamental Horticulture
Lake County Area Vocational Center
19525 W. Washington St.
Grayslake IL 60030
223-6681

ex-officio:
Nona Denton & Dave Love
ISBE-DAVTE - Research & Development
100 North 1st Street
Springfield IL 62777
217/782-4620

LAKE COUNTY AREA VOCATIONAL CENTER
1983-84

GENERAL ADVISORY COUNCIL

Robert P. Neal, Chairperson
ABLE ELECTRONICS, INC.
2411 Washington Street
Waukegan, Il 60085

Cliff Peacy
KERN HEATING
2011 Sheridan Rd.
Zion, Il 60099

Warren Bross/AB
E I DUPONT DE NEMOURS & CO., INC.
7828 N. Merriman Ave.
Morton Grove, Il 60053

Herman Szonn/AS
SESSLER FORD
1010 S. Milwaukee Ave.
Libertyville, IL 60048

Reno Fabbri/BT
FABBRI MASONRY CONSTRUCTION
331 Burchell Ave.
Highwood, IL 60040

Lorenz Schmidt/DP
15731 W. Woodbine
Mundelein, IL 60060

Marcia Sunderland/CC
2925 Witchwood Lane
Waukegan, IL 60085

Mary Hinkler/COS
34841 W. Leonard Ave.
Ingleside, IL 60041

William Knauz/DM
KNAUZ CONTINENTAL AUTOS
1044 North Western Ave.
Lake Forest, IL 60045

Dolores Stevens/FS
WINCHESTER HOUSE
1125 N. Milwaukee Ave.
Libertyville, IL 60048

John Kleber/GC
1307 Gages Lake Road
Wildwood, IL 60030

Charlene Hendrickson/HC Aide
LAKE COUNTY HEALTH DEPARTMENT
2400 Belvidere Road
Waukegan, IL 60085

Edward Fisher/HT
OLD ELM COUNTRY CLUB
800 Old Elm Rd.
Highland Park, IL 60035

Lynn Hoselton /IEM
ABBOTT LABORATORIES
14th & Sheridan
North Chicago, IL 60064

Rolf Andersson/MS
ANDERSSON TOOL & DIE
1717 Kenosha Road
Zion, IL 60099

Mason L. Ridlen/MP
NAVAL INSTRUCTIONAL PROGRAM DEVELOPMENT
Building 90, Naval Base
Great Lakes, IL 60088

Dr. A.T. Sampolinski/MA
2045 E. Grand Ave.
Lindenhurst, IL 60046

Ivan Eddy/R/TV
CHERRY ELECTRICAL PROD. CORP.
3600 Sunset
Waukegan, IL 60087

Gabrielle Scaccia/SOC
VICTORY MEMORIAL HOSPITAL
1324 North Sheridan Road
Waukegan, IL 60085

Dan Fendick/SE
PAULEY PONTIAC
1111 South Milwaukee Ave.
Libertyville, IL 60048

Jerry Kroll/WE
COLLEGE OF LAKE COUNTY
19351 W. Washington St.
Grayslake, IL 60030

L C A V C

COORDINATING COMMITTEE

1983-84

19	ALDEN-HEBRON COMMUNITY HIGH SCHOOL - Diane Hefty 9604 Illinois St.	Hebron, IL 60034	815-648-2442
117	ANTIOCH COMMUNITY HIGH SCHOOL - Adrian Mueller 1133 S. Main St.	Antioch, IL 60002	395-1421
113	DEERFIELD HIGH SCHOOL - Dale Galsky 1959 N. Waukegan Rd.	Deerfield, IL 60015	945-5440
124	GRANT COMMUNITY HIGH SCHOOL - Bob Kohler 285 E. Grand Ave.	Fox Lake, IL 60020	587-2561
127	GRAYSLAKE COMMUNITY HIGH SCHOOL - Mary Hoelterhoff 400 N. Lake St.	Grayslake, IL 60030	223-8621
214	HERSEY HIGH SCHOOL DIST. 214 - Louise Wilson 1900 E. Thomas	Arlington Heights, IL 60004	259-8500 or 5155
113	HIGHLAND PARK HIGH SCHOOL - Alan Kooperman 433 Vine Ave.	Highland Park, IL 60035	432-6510
12	JOHNSBURG HIGH SCHOOL - Robert Gough 2117 W. Church St.	McHenry, IL 60050	815-385-9233
115	LAKE FOREST HIGH SCHOOL - Dick Triptow 1285 N. McKinley	Lake Forest, IL 60045	234-3600
95	LAKE ZURICH HIGH SCHOOL - John Hutten 300 N. Church St.	Lake Zurich, IL 60047	438-5155
128	LIBERTYVILLE HIGH SCHOOL - Eugene Brakel (367-3151) 708 W. Park Ave.	Libertyville, IL 60048	367-3100
120	MUNDELEIN HIGH SCHOOL - Jane Falls 1350 W. Hawley St.	Mundelein, IL 60060	949-2200
123	NORTH CHICAGO COMMUNITY HIGH SCHOOL - Georgia Van Cleave 1717 - 17th St.	North Chicago, IL 60064	578-7400
157	RICHMOND-BURTON HIGH SCHOOL - John Vayo 10006 Main St.	Richmond, IL 60071	815-678-4525
116	ROUND LAKE SENIOR HIGH SCHOOL - John Bidney 800 High School Drive	Round Lake, IL 60073	546-2128
125	STEVENSON HIGH SCHOOL - Richard Vogtsberger Route 22	Prairie View, IL 60069	634-4000
121	WARREN TWP. HIGH SCHOOL - Dorothy Michno 500 N. O'Plaine Rd.	Gurnee, IL 60031	662-4363
118	WAUCONDA HIGH SCHOOL - Fred Loffredo 555 N. Main St.	Wauconda, IL 60084	526-6611
60	WAUKEGAN EAST HIGH SCHOOL - Arnie Berendsen 1011 Washington St.	Waukegan, IL 60085	336-3100
60	WAUKEGAN WEST HIGH SCHOOL - Wally Rucks 2325 Brookside	Waukegan, IL 60085	336-3100
126	ZION-BENTON HIGH SCHOOL - Dr. Jerome Budzik 1606 W. 23rd St.	Zion, IL 60099	746-1202

LAKE COUNTY AREA VOCATIONAL CENTER
Instructional Staff
1983-84

	INSTRUCTOR	PROGRAM AREA
1.	Duane Adamski	Auto Body
2.	Paul Aken	Graphic Communications
3.	Timothy Anderson	Auto Mechanics
4.	Paul Baumunk	Small Engine/Recreational Vehicle
5.	Jeffrey Brierton	Auto Body
6.	Dawn Brumm	Commercial Food Service
7.	Joanne Fielding	Care & Guidance of Children
8.	Michael Francis	Auto Mechanics
9.	Kathryn Gemple	Special Education
10.	Steven Gurevitz	Machine Shop
11.	Ronald Hassan	Air Conditioning/Heating/Refrigeration
12.	Martin Hollander	Media Specialist
13.	Marjorie Lambert	Cosmetology
14.	Gary Merriman	Welding-Fabrication
15.	Rose Meyer	Medical Assisting
16.	Judy Ozarke	Care & Guidance of Children
17.	Robert Parker	Business Data Processing
18.	Joseph Pregrocki	Building Trades
19.	Janet Robinson	Secretarial Office Occupations
20.	Barbara Rundquist	Cosmetology
21.	James Sands	Business Data Processing
22.	Robert Santner	Business Data Processing
23.	Raymond Snider	Radio/TV Repair
24.	Connie Stamer	Cosmetology
25.	Margaret Stanczak	Health Care Assistant
26.	Richard Stevens	Diesel Mechanics
27.	Melvin Whitmer	Industrial Electrical Maintenance
28.	Jeffrey Yordy	Ornamental Horticulture

CIVE PROJECT

Staff
1983-84

NAME AND ADDRESS	PROGRAM	TELEPHONE
DR. URBAN OEN 27 W. 581 RIDGE VIEW WEST CHICAGO, IL 60185	PROJECT DIRECTOR	293-0845
LOVERN, MARIAN R. 246 EDGEWATER DRIVE BLOOMINGDALE, IL 60108	PROJECT ASSISTANT	351-3184
BOESE, JOAN M. 0N022 ELMWOOD STREET WINFIELD, IL 60190	CONSULTANT	665-2637
DIMMLICH, DAVID 4152 W. ORANGEVILLE ROAD MC CONNELL, IL 61050	CONSULTANT	815-868-2460
LA BONTE, DAVID 1821 SEVEN PINES ROAD #11 SPRINGFIELD, IL 62704	CONSULTANT	217-793-0361

LAKE COUNTY COMPUTER TECHNOLOGY CONSORTIUM

1983-84
Staff

NAME AND ADDRESS	PROGRAM	TELEPHONE
DR. ALLEN DAVIS 1008 LARAMIE LANE JANESVILLE, WI 53545	DIRECTOR	608-756-2739
SHARON PIKUL 572 FAIRWAY VIEW DRIVE #1B WHEELING, IL 60090	ASSISTANT DIRECTOR	537-5879
SHARI FRY 2501 BONNER LANE LINDENHURST, IL 60046	ADMINISTRATIVE AIDE	356-1299

Education for Technology Employment Project

List of firms surveyed: 1983-84

	Name of business/industry	Address	City	Phone
1.	Koeunes Greenhouse	RR 5 -	Antioch	395-0101
2.	Leider and Sons Inc.	Aptakisic Road	Prairie View	634-4100
3.	Leiders Garden Greenery	RR 83	Grayslake	223-2422
4.	Synnestvedt and Assoc.	RR 120 & Fairfield	Round Lake	546-4700
5.	Weiler Inc.	1280 Wincntn Dr.	Deerfield	945-1602
6.	Theodore Brickman Co.	W. Long Grove Rd.	Lake Zurich	438-8211
7.	Fiore Co. Inc.	1274 S. Telegraph	Lake Forest	234-0020
8.	Bob's Green Thumb Landscaping	23612 N. Rt. 21	Mundelein	634-9300
9.	Glen Rock Beverage Co.	834 Glen Rock Ave.	Waukegan	336-0405
10.	Solo Cup Co.	1700 Old Deerfield Rd.	Highland Park	831-4800
11.	International Min & Chem	421 E. Hawley	Mundelein	566-2600
12.	Thompson-Hayward Chem. Co.	2 West Madison	Waukegan	623-1600
13.	Container Technologies	28w152 Commercial	Barrington	382-1000
14.	Exxon Corp-Pete Rose	351 N. Oakwood	Lake Zurich	438-2111
15.	Woodland Engineering	122 Baker Rd.	Libertyville	362-0110
16.	Bartholomew Engineering	1030 Alma Circle	Round Lake	546-5356
17.	Swiss Automation	3 Hillview Dr.	Barrington	381-4405
18.	MTC Gear Corp.	105 Bradley Dr.	Libertyville	362-7200
19.	Acme Burgess Inc.	RR 83	Grayslake	223-4821
20.	Hi-Tech Inc.	3600 - 16th	Zion	746-2447
21.	Mill Tech Products Inc.	737 Magnolia Ave.	Barrington	382-2342
22.	Teletech Inc.	1746 Elmwood Dr.	Highland Park	831-3800
23.	Radar Scan Corp. Delaware	28W123 Industrial	Barrington	382-2090
24.	Laserlign Inc.	4190 Grove Ave.	Gurnee	249-5150
25.	Scientific Products Div.	1430 Waukegan Rd.	Waukegan	973-3600
26.	Hyland Laboratories Div.	RR 120	Round Lake	546-7411
27.	Schaff Piano String Corp.	451 Oakwood Rd.	Lake Zurich	438-4556
28.	Teletronix of the Midwest Inc.	8 Skokie Blvd.	Lake Bluff	295-6090
29.	Accurate Tax & Accounting	209 S. Milwaukee	Lake Villa	356-1777
30.	General Information Systems	122 Deerpath Dr.	Mundelein	680-1670
31.	Micro Labs Inc.	3218 Skokie Valley Rd.	Highland Park	433-7550
2.	Durley Industries Inc.	RR 45	Grayslake	223-7177
33.	Northern Ill. Police Crime Lab	1677 Deerfield	Highland Park	432-8160
34.	Research Technology Inc.	231 Peterson	Libertyville	362-0942
35.	Technological Serv. & Mail Co.	22N49 Pepper Rd.	Barrington	381-6320

	Name of business/industry	Address	City	Phone
6.	Dobson Industries Inc.	957 Pheasant Ridge Rd.	Lake Zurich	438-8837
37.	Boyle Engineering Labs Co.	840 Tower Rd.	Mundelein	566-0330
38.	Environmental Test Assoc. Inc.	784 Central Ave.	Highland Park	432-2670
39.	Marriott Corp.	I94 & RR 132	Gurnee	249-1776
40.	Condell Memorial Hospital	Stewart & Cleveland	Libertyville	362-2900
41.	U T I Tech Inc.	901 Grand	Waukegan	249-1212
42.	The Design Co-Op	RR 60 & Fremont Ctr. Rd.	Grayslake	223-3450
43.	The Hattis Associates	Wilmot Rd.	Deerfield	945-8100
44.	Luxor Corp.	2245 Delaney Rd.	Waukegan	244-1800
45.	Illinois Bronze	300 E. Main	Lake Zurich	438-8201
46.	Foam Forms	10 Foam Forms Pl.	Waukegan	336-2700
47.	Anchor Hocking	1955 N. Delany Rd.	Gurnee	244-1000
48.	Fansteel	1 Tantalum Place	North Chicago	689-4900
49.	Excello	909 Tower Rd.	Mundelein	566-9400
50.	Die-Lectron	950 Rand Rd.	Wauconda	526-8434
51.	MacLean Mfg.	1486 Peterson Rd.	Libertyville	367-5350
2.	Basic Electronics	108 W. Rollins Rd.	Round Lake	546-8251
53.	Flo-Tech	403 Washington Ave.	Mundelein	566-9120
54.	Hinde Eng.	654 Deerfield Rd.	Highland Park	432-6031
55.	Ruggles Elec.	RR 83	Antioch	395-1222
56.	Tesdata Sys.	2275 Half Day Rd.	Deerfield	948-8700
57.	Electronic Counters	1500 McCormick Blvd.	Mundelein	362-8910
58.	Liquid Controls	Waukegan Rd.	North Chicago	689-2400
59.	Eagle Test Sys.	1354 Armour Blvd.	Mundelein	367-8282
60.	HD Elec.	760 Osterman Ave.	Deerfield	945-0801
61.	Stevens Instr.	111 Greenwood Ave.	Waukegan	336-9375
62.	Brencor Inc.	1493 Old Deerfield Rd.	Highland Park	831-2650
63.	Edax Intl.	103 Schelter Rd.	Prairie View	634-0600
64.	All Tech Assoc.	2051 Waukegan Rd.	Deerfield	948-8600
65.	Gulbrandsen	1129 Cherry	Deerfield	945-4458
66.	Kitchens of Sara Lee	500 Waukegan Rd.	Deerfield	945-2525
67.	Print Packing	730 Waukegan Rd.	Deerfield	945-9200
68.	American Aikoku Inc.	2275 Half Day Rd.	Deerfield	948-7290
69.	Kleinschmidt Division	Lake Cook Rd.	Deerfield	945-1000
70.	Goelitz Confectionery	1501 Norrow Rd.	North Chicago	689-2225
71.	Proxtrol Prod. Inc.	2516 Commonwealth Ave.	North Chicago	689-4440
72.	Hall Industries	2323 Commonwealth Ave.	North Chicago	689-4220

	Name of business/industry	Address	City	Phone
3.	Tuxco Corp.	1539 Morrow Ave.	North Chicago	689-4340
74.	Pfanstiehl	33000 Washington St.	Waukegan	623-1360
75.	Solar Plastics	1170 Allanson	Mundelein	566-2410
76.	Hubbell Corp.	407 E. Hawley	Mundelein	566-7330
77.	Schweitzer EO Mfg.	1520 McCormick Ave.	Mundelein	362-8304
78.	National Home	100 Honing Rd.	Fox Lake	587-6422
79.	Fill Rite Inc.	51 Nippersink Rd.	Fox Lake	587-5100
80.	Cand Aire Ind. Inc.	777 Central Ave.	Highland Park	432-4190
81.	Twenty Century Mfg.	Bradley Rd. & 176	Libertyville	362-4200
82.	Actown Electro Coil Inc.	729 E. Park Ave.	Libertyville	362-8780
83.	Analytical Insp. Spec Inc.	314 Carter	Libertyville	362-2779
84.	American Controls Ltd.	212 E. Main	Round Lake	546-6611
85.	Sonico Products	1631 Wood St.	Round Lake	223-5777
86.	Delta Therm Co. Inc.	398 Liberty	Wauconda	526-2407
87.	Elm Systems	1101 Brown St.	Wauconda	526-5003
88.	Streeter Amet	155 Wicks St.	Grayslake	223-4801
89.	Williams Video Games	Swanson Court	Gurnee	336-8590
0.	Buehler Ltd.	41 Waukegan Rd.	Lake Bluff	295-6500

COMPUTER MANAGED INSTRUCTION

CAM/MMS WORKSHOP - December 13 & 14, 1983

Participants:

1. LCAVC - Merv Pilotte
2. LCAVC - Dick Glogovsky, Proj. Dir.
3. LCAVC - Bob Parker
4. LCAVC - Jim Sands
5. DeKalb - John Cassani, Proj. Dir.
6. DeKalb - Alan Robinson, Proj. Coord.
7. Marissa (Beck AVC) - Bill Fever, Curr. Spec.
8. Freeport - Cathie Schmerse, Instr.
9. Freeport - Mike Palmer, Instr.
10. Freeport - Dick Linnell. Asst. Dir., SACC
11. Rockford - P. K. Dobbins, Instr.
12. Rockford - Robert Facklam, LRC Coord.
13. Quincy - Eugene Willimann, Proj. Dir.
14. Quincy - Stan McKelvie, Proj. Coord.
15. Will County - Willis Shay, Dir. of Curr.
16. Will County - Larry Larsen, Dir. Voc. Ed.
17. Will County - Tom Boldrey, KineticSystems
18. DAVTE- Peggy Pool, Contract Adm.
19. ICBVEP - Urban Oen, Proj. Dir.
20. ICBVEP - Joan Boese, Consult.
21. ICBVEP - Dave Dimmlich, Consult.
22. ICBVEP - Dave LaBonte, Consult.
23. ICBVEP - Jan Lathrop, Consult.
24. ICBVEP - Masako Shin, Consult.
25. ICBVEP - Wangshik Shin (for Bev Stitt, Consult)
26. Chicago - Dan Racich, Instr.
27. Eastern Ill. Univ. - Gene Strandberg

Presenters:

1. Don Sension
2. John Erickson

Observers:

1. Rockford - Chuck Mufich, Proj. Dir.
2. Rockford - Mike Zawlocki

Dec. 13 only:

1. NIU - Tom Erekson, Proj. Co-Dir.

SECRETARIAL OFFICE OCCUPATIONS
1983-1984
ADVISORY COMMITTEE

Mrs. Sally Preissig
COLLEGE OF LAKE COUNTY
19351 W. Washington Ave.
Grayslake, IL 60030

Ms. Katharina Effinger
VICTORY MEMORIAL HOSPITAL
1324 N. Sheridan Rd.
Waukegan, IL 60085

Ms Sandra Hull
GRANT COMMUNITY HIGH SCHOOL
285 E. Grand Ave.
Fox Lake, IL 60020

Mr. James Prunty
WAUKEGAN EAST HIGH SCHOOL
1011 Washington St.
Waukegan, IL 60085

Ms. Nancy Wolf
ST. THERESE HOSPITAL
2615 W. Washington St.
Waukegan IL 60085

Ms. Gabrielle Scaccia, Chairperson
VICTORY MEMORIAL HOSPITAL
1324 N. Sheridan Rd.
Waukegan, IL 60085

Ms. Flo Ochsner
RUSTOLEUM
11 Hawthorn Parkway
Vernon Hills, IL 60061

Ms. Denise Charts
OMC
100 Seahorse Dr.
Waukegan, IL 60085

Ms. Mary Sroka
ILLINOIS BELL
2000 N. Lewis
Waukegan, IL 60085

Ms. Betty Freehling
DEERFIELD HIGH SCHOOL
1959 N. Waukegan
Deerfield, IL 60015

Ms. Nancy Brashear
ILLINOIS STATE SCHOLARSHIP
102 Wilmot Road
Deerfield, IL 60015

Mr. Mark Crilly
MARRIOTT"S GREAT AMERICA
Route 132
Gurnee, IL 60031

MEDICAL ASSISTING
Advisory Committee
1983 - 1984

	Dr. John Schroeder Chairperson 1616 Grand Avenue Waukegan, IL 60085	Work # Home #	662-1250	
*	Dr. Louis Lax, PhD Vice-Chairperson 1030 Higgins Road Ambulatory Monitoring Lab Inc. Schaumburg, IL 60195	Work # Home #	843-3921 662-5529	
	Dr. A. T. Sampolinski 2045 E. Grand Avenue Lindenhurst, IL 60046	Work # Home #	356-1080	
	Dr. John Kenfield Educational Chief to Staff-Education Verterans Administration Hospital North Chicago, IL 60064	Work # Home #	689-1900	Ext. 2513
	Mr. Pat McNulty 100 N. Shaddle Mundelein, IL 60060	Work # Home #	688-6862 668-3701 949-7463	 - Navy Drug Screening Lab Great Lakes Naval Base
	Ms. Bonnie Pearson, CMA 2045 E. Grand Avenue Lindenhurst, IL 60046	Work # Home #	356-1080	
*	Mr. John Sturcz 9841 West Paxton Drive Zion, IL 60099	Work # Home #	872-8722 872-7909	Ext. 243
*	Ms. Remedios Tesch College of Lake County Medical Lab Tech. Dept. Grayslake, IL 60030	Work # Home #	223-6601	Ext.

LAKE COUNTY AREA VOCATIONAL CENTER

MACHINE SHOP ADVISORY COMMITTEE
1983-84

	NAME	ADDRESS	COMPANY
1.	Wilfred B. Pouler	24101 119th St. Trevor, WI	
2.	Steve Gurevitz	19525 W. Washington St. Grayslake, IL	Lake County Area Vocational Center
3.	Dave Ehlert	9 Manor Rd. Lake Zurich, IL	Illinois Tool Works
4.	Chet Parker	2204 Brighton Arlington Heights, IL	Crown Supply
5.	Merv Pillotte	19525 W. Washington St. Grayslake, IL	Lake County Area Vocational Center
6.	Jerry Digilio	19351 W. Washington St. Grayslake, IL	College of Lake County
7.	John A. Domkowski		Jadpro Tool and Mfg.
8.	Melvin Whitmer	19525 W. Washington St. Grayslake, IL	Lake County Area Vocational Center
9.	Bob Anderson		Anderson Tool
10.	Dick Glogovsky	19525 W. Washington St. Grayslake, IL	Lake County Area Vocational Center
11.	Carl Johnson		OMC Johnson
12.	John O'Gorden		Great Lakes
13.	Rob Williams		Paxton/Patterson
14.	Bruce Ramsden		Paxton/Patterson
15.	Tom Schonquer		Aidex
16.	Gary Rockis		Aidex
17.	Ric Gudell		Machine Tool Trng Syst.

ARTICULATION MEETING WITH FEEDER DISTRICTS
BUSINESS EDUCATION CHAIRPERSONS

1983-84

	NAME	HIGH SCHOOL
1.	Maria Wozniak	Alden-Hebron
2.	Doug Johnson	Antioch
3.	Betty Freehling	Deerfield
4.	Sandra Hull	Grant
5.	Suzanne Sears	Grayslake
6.	Connie Kieffer	Highland Park
7.	Jan Bosman	Johnsburg
8.	Char Axh	Lake Forest
9.	Sally Lubeno	Lake Zurich
10.	Kathy Thompson	Libertyville
11.	Judy Stangel	Mundelein
12.	Jack Wallace	North Chicago
13.	Linda Davidson	Richmond-Burton
14.	Ila Bauer	Round Lake
15.	Donna Smith	Stevenson
16.	John Ariola	Warren
17.	Loretta McKay	Wauconda
18.	Jim Prunty	Waudegan East
19.	Flo Spero	Waukegan West
20.	Mary King	Zion-Benton

LAKE COUNTY AREA VOCATIONAL CENTER
Staff Development Workshops
Education for Technology Employment Project

1983-84

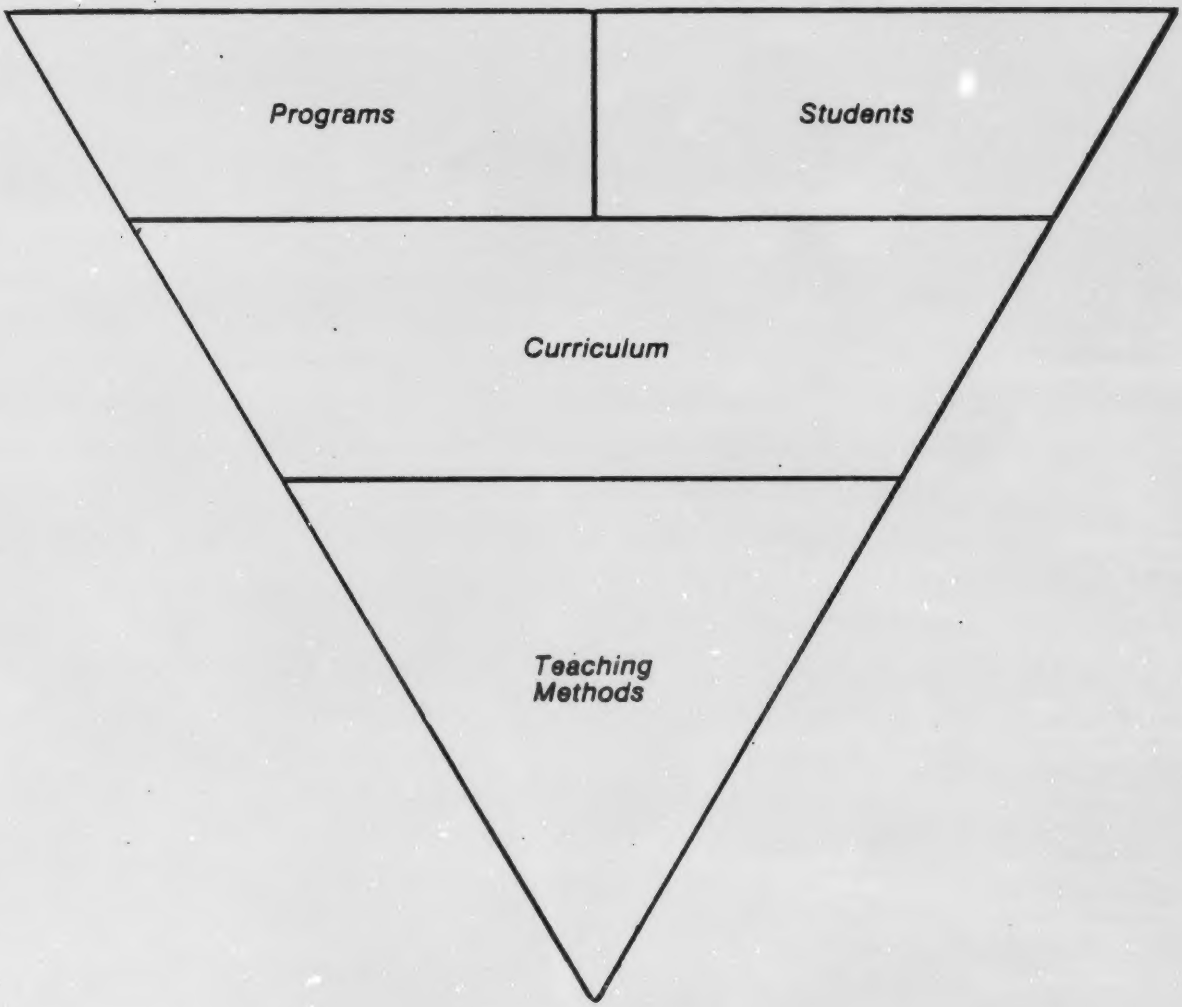
Listed below are LCAVC, feeder-district, and CLC staff who have already participated or are scheduled to participate in staff development workshops totally funded by the State's ETE project grant at Eastern Illinois University.

Next year LCAVC will again be the sponsoring agency for continuation of staff inservice workshops for both LCAVC staff and appropriate requests from the feeder districts. The purpose of this personnel development component is to focus on upgrading, and in some cases retraining, vocational education teachers with current generation technology in their areas of concentration.

School	Participant	Training Cost
Antioch High School	Roland Schleusener	$ 335.20
Deerfield High School	Betty Freehling	661.70
Grant High School	James Highley	-0-
Highland Park High School	Mary Jo Lynch	100.00
Round Lake High School	Janet Dommer	109.69
Round Lake High School	Sharon Rosinski	118.75
Round Lake High School	Bruce Britton	56.00
Round Lake High School	J. A. Woods	330.64
Stevenson High School	Donna Smith	600.00
Wauconda High School	Joe Fielding	40.00
Waukegan East High School	Dave Matuszak	307.00
Waukegan East High School	Jim Prunty	560.00
Waukegan East High School	Glen Dolmar	1,524.32
Waukegan West High School	Alan Hovey	1,197.80
Zion-Benton High School	Gary Slocum	354.20
9 Districts	15 Participants	$ 6,295.30
LCAVC	22 Participants	$ 5,783.83
CLC	1 Participant	$ 1,200.00

ARTICULATION DIRECTORY

Participating High Schools **Lake County Area Vocational Center** **College of Lake County**


Programs
Students
Curriculum
Teaching Methods

1983-1984

ARTICULATION DIRECTORY
1983-1984

PROGRAM AREAS	Lake County Area Vocational Center 223-6681	College of Lake County 223-6601	Alden-Hebron High School 815/648-2442	Antioch High School 395-1421	Deerfield High School 945-5440	Grant High School 587-2561	Grayslake High School 223-8621	Highland Park High School 432-6510	Johnsburg High School 815/385-9233	Lake Fores High Schoo 234-3600
Vocational Coordinator/ LCAVC Contact Person	Mike Anderson Ext. 201	Steve Springer Ext. 417	Diane Hefty	Adrian Mueller Ext. 270	D. Galsky Ext. 262	Robert Kohler	Mary Hoelterhoff	Alan Kooperman Ext. 222	S. Pollock or R. Kriewaldt	Dick Triptow
Air Cond/Htg/Refrig	Ron Hassan Ext. 253			Stu Good Ext. 286						Dennis Herrmann Ext. 37
Auto Body	Jeff Brierton Ext. 219			John Cortez Ext. 286				Jim Chamberlain Ext. 262		Bruce Cankar
Auto Mechanics	Mike Francis Ext. 223			John Cortez Ext. 286	J. Chamberlain Ext. 232	Jerry Robinson		Jim Chamberlain Ext. 262	Chuck Schultz	Bruce Cankar
Building Trades	Joe Pregrocki Ext. 252	Jerry Digilio Ext. 492		Ken Kasuboski Ext. 286	Ross Koepnick Ext. 232	James Highley		Ross Koepnick Ext. 260	John Quick	Dennis Herrmann Ext. 37
Child Care	Joanne Fielding Ext. 229	Linda Wetherbe Ext. 536		Glenda Sterk Ext. 285	D. Fitzgerald Ext. 261	Pam. Renaker	Susan Boardman	Barb Enns Ext. 272	Rita Gugel	Pat Lanza
* Computer Assisted Drafting (CAD)	TBA	James Resser Ext. 513		Roland Schleusener Ext. 286					Bill Dvonch	Bob Pelinka
Cosmetology	Marge Lambert Ext. 263			Adrian Mueller Ext. 270					S. Pollock or R. Kriewaldt	
Data Processing	Bob Parker Ext. 219	Dan Petrosko Ext. 565	Maria Wozniak	Doug Johnson Ext. 280	K. Cooksey Ext. 247	Sam Spasojevich	Ray Reidel		Lois Cocking	George Fossell
Diesel Mechanics	Rich Stevens Ext. 249			John Cortez Ext. 286					Chuck Schultz	
Fluid Power		Glen Keuss Ext. 507								Bruce Cankar
Food Service	Dawn Brumm Ext. 230			Linda Zeaman Ext. 285	M. Young Ext. 231	Linda Hofeldt	Susan Boardman	Kris McKavanagh Ext. 270	Pam Neumaier	
Graphic Communications	Paul Aken Ext. 231			Roland Schleusener Ext. 286					Jeff Jerdee	
Health Care Assistant	Margaret Stanczak Ext. 224	Virginia Thompson Ext. 444		Laurie Wilken Ext. 285	D. Fahler Ext. 236				Elaine Kee	Chris Felder
Horticulture	Jeff Yordy Ext. 228	Mark Zampardo Ext. 320		Gil Krahn Ext. 288					Bob Texidor	
Industrial Electrical Maintenance	Mel Whitmer Ext. 255	Jack Hudson Ext. 492		Dan Schlais Ext. 286		James Highley	Jerry Allen	Ross Koepnick Ext. 260	Bill Dvonch	Dennis Herrmann Ext. 37
Machine Shop	Steve Gurevitz Ext. 250	Jerry Digilio Ext. 492		Stu Good Ext. 286	J. Chamberlain Ext. 232	Dave Kapraun	Jerry Allen	Jim Chamberlain Ext. 260		
Media Specialist	Marty Hollander Ext. 247			Tom Herziger Ext. 260	L. Adler Ext. 226	William Renaker		Steve Alsberg Ext. 276		Dave Miller Ext. 37
Medical Assisting	Rose Meyer Ext. 217	Virginia Thompson Ext. 444		Laurie Wilken Ext. 285					Elaine Kee	
Radio/TV Repair	Ray Snider Ext. 232	Jack Hudson Ext. 492		Dan Schlais Ext. 286		James Highley		Ross Koepnick Ext. 260		Dennis Herrmann Ext. 37
Secretarial Office Occupations	Jan Robinson Ext. 238	Donald Holland Ext. 514	Maria Wozniak	Doug Johnson Ext. 280	B. Freehlin Ext. 260	Sandra Hull	Suzanne Sears		Jan Bosman	Char Ash
Small Engine/ Recreational Vehicle	Paul Baumunk Ext. 248			Greg Collins Ext. 286	J. Chamberlain Ext. 232	Jerry Robinson	Dave Sears	Jim Chamberlain Ext. 262	Wade Heisler	Bruce Cankar
Welding - Fabrication	Gary Merriman Ext. 222	Jerry Kroll Ext. 512		Stu Good Ext. 286	J. Chamberlain Ext. 232	Dave Kapraun	Jerry Allen	Jim Chamberlain Ext. 260	Chuck Schultz	Bruce Cankar

* NEW PROGRAM

BEST COPY AVAILABLE

The Lake County Area Vocational Center has formulated this Articulation Directory to identify key people in the various feeder high schools who are engaged in similar subjects or areas of teaching. Exchange of ideas and curriculum coordination are unlikely to occur unless some medium for communication is developed. It is hoped that this directory will spark communications on the subject of improved articulation between the schools listed below.

Lake Zurich High School	Libertyville High School	Mundelein High School	North Chicago High School	Richmond-Burton High School	Round Lake High School	Adlai E. Stevenson High School	Warren Township High School	Wauconda High School	Waukegan East High School	Waukegan West High School	Zion-Benton High School
438-5155	367-3100	949-2200	578-7400	815/678-4525	546-2128	634-4000	662-4363	526-6611	336-3100	336-3100	746-1202
John Hutten	Gary Hodgson Eugene Brakel	Jane Falls Ext. 2208	Georgia Van Cleave 578-7411	John Vayo	John Bidney	Richard Vogtsberger Ext. 216	Dorothy Michno Ext. 41	Fred Loffredo	Arnold Berendsen	Walter Rucks Ext. 612	Dr. Jerome Budzik Ext. 214
	Bill Stairwalt 367-3144										
	Julian Emanuelson 367-3144	John Lentz Ext. 2221	Ted Hudson Ext. 27			Robert Hoffman Ext. 206		Dave Falk			John Davis
	Charles Kranz 367-3144	John Lentz Ext. 2221	Ted Hudson Ext. 27		Bruce Britton	Robert Hoffman Ext. 206		Dave Falk	Myron Eyestone Ext. 560	Ed Culberson Ext. 660	Patrick Yanik Ext. 362
Fred Gscheidle	Bill Stairwalt 367-3144	Bob Sweeney Ext. 2221	Jorge Colon 578-7437	Ralph Davis	George Firnbach	Richard Johannsen Ext. 212	Matt Vanlerberghe Ext. 55	Lonn Calanca	Bob Colpetzer Ext. 560	Ronald Dahlman Ext. 560	Jim O'Toole Ext. 357
Sue Moenning	Ellen Whitmore	Elaine Zuehlke Ext. 2201	Sylvia Hu 578-7441		Jean Woods	June Bergquist Ext. 286	D. Gilmore Mary Dietz Ext. 54	Murriel Riedesel	Connie Sheffield Ext. 544	Joanne Warner Ext. 544	Florence Carlson Ext. 366
	Don Totter 367-3111				Jack Woods	Richard Johannsen Ext. 212		Dan Thornton Gary Simon	Glen Dolmar Ext. 560		
		Jane Falls Ext. 2208	Georgia Van Cleave 578-7411							Louis Marello Ext. 566	Dr. Jerome Budzik Ext. 214
Jim Hallett		Jeri Phillips Ext. 2206	Robert Johnson 578-7435	Dave Usrey	Ila Bauer	Sam Ritchie Ext. 217	E. Keefauver R. Richey Ext. 58	Dan Thornton	Jeff Allen Ext. 545	Don Tremper Ext. 645	Joe Hutten Ext. 365
	Charles Kranz 367-3144		Ted Hudson 578-7437		Bruce Britton	Robert Hoffman Ext. 206			Myron Eyestone Ext. 560		John Davis Ext. 362
						Robert Hoffman Ext. 206	Kurt Bristol Ext. 55				
Sue Moenning	Ellen Whitmore 367-3171	Elaine Zuehlke Ext. 2201	Sylvia Hu 578-7441	Jan Ziemann		Jean Wolf Ext. 203	Fran Maurath Ext. 54	Margaret Fosse	Connie Sheffield Ext. 544	Mildred Futch Ext. 544	Jean Windberg Ext. 366
	Chuck Swanson 367-3144				Randy Hoff	Bill Kirchherr Ext. 212	Richard Flaker Ext. 55		Al Trafford Ext. 564	Christie Albers Ext. 660	Dick Meyer Ext. 360
John Carr	Andy Bitta	Kathie Carr Ext. 2214	Georgia Van Cleave 578-7411		Julie Barnicle	Ed Kositzki Ext. 210		Margaret Fosse	Louis Marello Ext. 566	Louis Marello Ext. 566	David Mayhak Ext. 325
			Georgia Van Cleave 578-7411				Ralph Harvey Ext. 59				
Jim Lang	Myron Konkle 367-3144	Jim Jackson Ext. 2221	Ted Hudson 578-7437					Dave Falk	Dave Matuszak Ext. 560	Ed Culberson Ext. 660	Jeff Greuel Ext. 223
	Julian Emanuelson 367-3144	Jim Jackson Ext. 2221	Ed Skinner 578-7437	Ralph Davis	Mr. Ameri			Lonn Calanca	Dave Matuszak Ext. 560	Ron Sanderlin Ext. 660	Mike McGue Ext. 223
	Don Totter 367-3111		Duane Kovacek		Fran Dmytro	Pat O'Donnell Ext. 250	Fred Kattner Ext. 36		Jody Stewart Ext. 559		Karen Grooves Ext. 225
			Georgia Van Cleave 578-7411		Julie Barnicle				Louis Marello Ext. 566		David Mayhak Ext. 325
Jim Lang	Myron Konkle 367-3144	Bob Sweeney Ext. 2221	Ted Hudson 578-7437					Dave Falk	Dave Matuszak Ext. 560		Jeff Greuel Ext. 223
Sally Lubeno	Kathy Thompson 367-3172	Judy Stangel Ext. 2206	Jack Wallace 578-7419	Linda Davidson	Ila Bauer	Donna Smith Ext. 262	John Ariola Ext. 63	Loretta McKay	Jeff Allen Ext. 545	Flo Spero Ext. 645	Mary King Ext. 365
	Harry Carlson 367-3144	Jim Jackson Ext. 2221	Ted Hudson 578-7437			Robert Hoffman Ext. 206		Dave Falk	Myron Eyestone Ext. 560	Ed Culberson Ext. 660	Darrel Schattl Ext. 223
	Julian Emanuelson 367-3144	Jim Jackson Ext. 2221	Ed Skinner 578-7437	Ralph Davis	Mr. Ameri			Lonn Calanca	Dave Matuszak Ext. 560	Ron Sanderlin Ext. 660	Mike McGue Ext. 223

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LAKE COUNTY AREA VOCATIONAL CENTER

Extended Campus Activities

1983-84

Program	No. Locations	No. Students	Average Participation Time
Business Data Processing	29	55	3 weeks
Care & Guidance of Children	18	28	4 weeks
Graphic Communications	1	1	5 weeks
Health Care Assistant	5	43	26 hours
Medical Assisting	15	15	4 weeks
Ornamental Horticulture	1	1	12 weeks
Secretarial Office Occupations	8	24	5 days

More detailed information on locations, etc. available on request.

PRODUCT ABSTRACTS

Information/Word Processing Competency List

Secretarial Office Occupations Revised
Curriculum Outline

Secretarial Office Occupations Listing
of Tasks by Job Title

Student Learning Guide - Create & print a
document on the OIS 60

Machine Shop Task List

Student Learning Guides - Numerical Control
and Computer Numerical Control

Employer/Employee Skill Survey

Product Abstracts:

Product abstracts are attached for all materials developed during the 1983-1984 school year.

Major Goals

A. Formation of a High Tech Consortium with selected members from business industry, and education and seek input concerning suggestions for high tech programs skills/knowledge designed for integration into the vocational curriculum at the secondary level.

B. Plan and develop a series of alternatives by which vocational education programs at a secondary school level can be designed to prepare students to enter into high technology program at the community college level.

Illinois State Board of Education

Department of Adult, Vocational and Technical Education
Research and Development Section

Product Abstract

1. Title of material Information/ Word Processing - Competency List
2. Date material was completed May 1984
3. Please check one: New material X Revised material _____ Field-tested material _____
4. Originating agency Lake County Area Vocational Center

   Address 19525 W. Washington St. Grayslake, IL Zip Code 60030
5. Name(s) of developer(s) Janet Robinson

   Address 788 Bernard Dr. Buffalo Grove, IL Zip Code 60090
6. Developed pursuant to Contract Number R-99-14X-0313-499

7. Subject Matter (Check only one according to Department of Education Code):

Code

_____ 01 Agricultural Education
X 03 Business and Office Education
_____ 04 Distributive Education
_____ 07 Health Occupations Education
_____ 09 Home Economics Education
_____ 10 Industrial Arts Education
_____ 16 Technical Education
_____ 17 Trade and Industrial Education
_____ 22 Cooperative Education
_____ Career Education
_____ Other (Specify) _____

8. Education Level:

_____ Pre-K Thru 6
X Post-Secondary
_____ Administrator (Pre-Service)
_____ 7-8
X Adult
_____ 9-10
_____ Teacher (Pre-service)
_____ Other (Specify) _____
X 11-12

9. Intended for Use By:

X Student
_____ Teacher Educator
X Classroom Teacher
X Guidance Staff
X Local Administrator
X State Personnel
_____ Other (Specify) _____

10. Student Type:

X Regular
_____ Limited-English Proficiency
_____ Disadvantaged
_____ Handicapped
_____ Other (Specify) _____

11. Medium and Format of Materials:

X HARDCOPY

No. of pages 6
_____ Paper bound
_____ Hard bound
X Loose-leaf
Photos: Yes _____ No X
Diagrams: Yes _____ No X

_____ VIDEOTAPE

_____ Minutes
_____ B & W
_____ Color
_____ inches

_____ FILM

_____ Minutes
_____ B & W
_____ Color
_____ mm

_____ MICROFICHE

_____ B & W
_____ Color

N-A

___ SLIDES	___ FILM STRIPS	___ AUDIO	___ OTHER
No of frames ___	No of frames ___	___ Automatic synch	Specify:
___ B & W	___ B & W	______ Hz	___
___ Color	___ Color	___ Manual cue	___
___ Audio	___ Audio	___ Reel	___
___ Carousel provided		___ Cassette	
___ Other packaging used		___ Cartridge	
(Specify) ___			

12. Availability:

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X In ERIC system (No. ___)   ___ Loan copy available

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Illinois Vocational Curr. Center

Address Sangamon State University Zip Code ___

Springfield, IL

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Contact: Name N-A Phone ( ) ___

Address ___ Zip Code ___

14. What level(s) of assistance is required to provide implementation of this outcome?

X awareness   ___ understanding

___ deciding   ___ implementing

15. Are Consultive/Inservice (or staff development) available? Yes X No ___

Contact:
Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Research and Development Section, E-426
100 North First Street
Springfield, IL 62777
(217) 782-4620

16. General Description (State the general objective and suggested method of use. Summarize the content and tell how it is organized. Write the description so that it can be used to promote the material. Continue on back of this sheet or on another sheet, if necessary.) Answer below

17. Person Completing this Abstract: Richard Glogovsky

Full Address:

19525 W. Washington St.

Grayslake, IL

Zip 60030

16. The Competency task list for Information/Word Processing has been developed to assist Business Education instructors in updating their Secretarial Curriculum with the latest technology. The competency list begins with the identification of basic skills/knowledge and progresses to a more advanced level of knowledge with the integration of new technology.

Information/Word Processing
Competency List

Information/Word Processing

1. Concepts
    a. Define information processing
    b. Recognize significant events in the development of information/word processing technology
    c. Identify information/word processing document cycle
        1. Input
        2. Output
        3. Copy processing
        4. Copy distribution
    d. Recognize changes in office organization
        1. Traditional
        2. Centralized
        3. Satellite
        4. Mini-centers
        5. Automated work centers

    e. Identify types of equipment
        1. Origination
            a. Endless loop
            b. Discrete media
                1. Hand held
                2. Desk top
                3. Centralized
            c. Computer aided
        2. Production
            a. Components
            b. Types of display
            c. Storage
            d. Keyboards
            e. System Configurations

            1. Standalone
            2. Clustered systems
            3. Time-shared systems
        f. Printers and print devices
    3. Copy Processing
        a. Repetitive typing
        b. Offset/phototypesetting
        c. Photocopiers/intelligent copiers
        d. Microfilming - COM
    4. Copy Distribution
        a. U.S. Postal Service/computers
        b. Electronic mail
        c. TWX - Telex
        d. Communicating word processors
        e. Voice mail
f. Identify careers and/career paths

2. Operate word processing equipment
    a. Become familiar with the components of the system
        1. Create, edit, print, and file a short document
        2. Select word processing activities from the menu
        3. Describe keys that are not available on a typewriter
        4. Describe the purpose of the cursor and demonstrate movement
        5. List the four basic steps in word processing
    b. Interpret data on the screen
        1. List three types of information the screen displays
        2. Describe the purpose of the status line, the format line, and the message line
        3. Describe the difference between the primary and secondary format lines
        4. Define the amount of text that fills a screen, a page, and a document

c. Identify and describe special function keys
    1. List three character keys that are used differently on a typewriter and a word processor
    2. Describe procedures for creating special characters
    3. Describe the purpose of the combination keys
    4. Describe the purpose of screen graphics
    5. Describe the purpose of the format, edit, and transaction keys
    6. List the repeating keys

d. Perform basic operations
    1. Describe how the parts of the system work together
    2. Create a new document
    3. Describe the purpose of document index
    4. Edit a document
    5. Print a document
    6. Cancel a print request

e. Manage files
    1. List several efficient filing practices
    2. Describe the parts of an archive diskette
    3. Describe the care and handling of archive diskettes
    4. Prepare an archive diskette
    5. File single documents onto an archive diskette
    6. File multiple documents onto an archive diskette
    7. Describe the purpose of range filing
    8. Print a document index for a library and for an archive diskette
    9. Duplicate an archive diskette

f. Format text
    1. Use a forms ruler
    2. Revise format lines
    3. Use the horizontal scroll feature
    4. Use the format keys
    5. Format columns of text
    6. Create pages in a document

g. Edit text
    1. Edit text using strikeover
    2. Edit text using delete
    3. Edit text using insert
    4. Correct errors while inserting text
    5. Edit text using REPLC
    6. Adjust page length using the automatic pagination feature

h. Copy and move text
    1. Copy/move text in a document
    2. Copy/move text with a format line
    3. Copy/move text from another document

i. Perform advanced formatting
    1. Recall a copy of the primary format line
    2. Delete alternate format lines
    3. Center headings over columns
    4. Use the following format attributes: underscore, autoscore, double underscore, boldface, strike thru, superscript, or subscript
    5. Hyphenate line endings
    6. Protect pages during pagination
    7. Create headers and footers in a document

j. Perform advanced printing
    1. Stop the printer to change a print wheel
    2. Print proportionally spaced text

k. Use typewriter feature

l. Print documents using dual column feature

m. Merge two documents

n. Sort data
    1. Prepare text for sorting
    2. Sort text alphabetically
    3. Sort text numerically

o. Number paragraphs automatically
    1. Number data with arabic numbers
    2. Number in outline form

p. Generate a table of contents

q. Use calculator feature
   1. Add, subtract, multiply, divide
   2. Print calculated results

r. Modify format lines globally
   1. Modify all format lines
   2. Modify formats for one or more pages
   3. Modify one format

s. Generate an index by key word

t. Send messages to workstations using the mailbox

u. Perform super global replace

v. Process lists of data
   1. Create a file
   2. Add records
   3. Edit records
   4. Select records
   5. Sort records
   6. Revise selected records
   7. Output selected records
   8. Delete selected records
   9. Rename, delete, reformat information
   10. Compress files

w. Display business graphics
   1. Create standard graphic report formats in bar, line, and pie charts
   2. Label horizontal and vertical axes
   3. Create explanatory legends

x. Assemble documents from stored paragraphs
   1. Create paragraphs
   2. Enter paragraphs
   3. Create and output a document
   4. Print assembled document

y. Manage a data base
   1. Enter information into a data base
   2. Select and/or sort records from the data base

    3. Process retrieved data
    4. Update records
    5. Print or display results of a query
    6. Save, edit, delete, or execute previously defined data manipulations and output definitions
    7. Create a data dictionary
    8. Merge documents
    9. Print reports

z. Operate multiplan

    1. Enter text and number
    2. Create formulas
    3. Edit worksheets
    4. Format worksheets
    5. Print worksheets
    6. Link worksheets

aa. Verify data for correct spelling

Illinois State Board of Education

Department of Adult, Vocational and Technical Education
Research and Development Section

Product Abstract

1. Title of material Secretarial Office Occupations (Revised Curriculum Outline)
2. Date material was completed April 16, 1984
3. Please check one: New material X Revised material ____ Field-tested material ____
4. Originating agency Lake County Area Vocational Center

   Address 19525 W. Washington St. Grayslake, IL Zip Code 60030
5. Name(s) of developer(s) Janet Robinson

   Address 788 Bernard Drive Buffalo Grove, IL Zip Code 60090
6. Developed pursuant to Contract Number R-99-14-X-0313-499

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____ 10 Industrial Arts Education
____ 16 Technical Education
____ 17 Trade and Industrial Education
____ 22 Cooperative Education
____ Career Education
____ Other (Specify) ____

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8. Education Level:

____ Pre-K Thru 6 ____ 7-8 ____ 9-10 X 11-12
X Post-Secondary X Adult ____ Teacher (Pre-service)
____ Administrator (Pre-Service) ____ Other (Specify) ____

---

9. Intended for Use By:

X Student X Classroom Teacher X Local Administrator
____ Teacher Educator ____ Guidance Staff ____ State Personnel
____ Other (Specify) ____

---

10. Student Type:

X Regular ____ Disadvantaged ____ Handicapped
____ Limited-English Proficiency ____ Other (Specify) ____

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11. Medium and Format of Materials:

X HARDCOPY
No. of pages 18
X Paper bound
____ Hard bound
____ Loose-leaf

____ VIDEOTAPE
____ Minutes
____ B & W
____ Color
____ inches

____ FILM
____ Minutes
____ B & W
____ Color
____ mm

____ MICROFICHE
____ B & W
____ Color

Photos: Yes ____ No ____
Diagrams: Yes ____ No ____

N-A

____ SLIDES

No of frames ____
____ B & W
____ Color
____ Audio
____ Carousel provided
____ Other packaging used
(Specify) ____________

____ FILM STRIPS

No of frames ____
____ B & W
____ Color
____ Audio

____ AUDIO

____ Automatic synch
________ Hz
____ Manual cue
____ Reel
____ Cassette
____ Cartridge

____ OTHER

Specify:
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Contact: Name East Central Network for Curr. Coordination Phone (217) 786-6375
Illinois Vocational Curriculum Center
Address Sangamon State University Springfield, IL Zip Code 62708

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Contact: Name None Phone ( ) ____
Address ____________ Zip Code ____

14. What level(s) of assistance is required to provide implementation of this outcome?

____ awareness
____ deciding
X understanding
X implementing

15. Are Consultive/Inservice (or staff development) available? Yes ____ No ____

Contact: Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Research and Development Section, E-426
100 North First Street
Springfield, IL 62777
(217) 782-4620

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17. Person Completing this Abstract: Richard Glogovsky

Full Address:

Lake County Area Vocational Center (312) 223-6681
19525 W. Washington St.
Grayslake, IL Zip 60030

16. This Secretarial Office Occupations curriculum outline has been totally updated and includes the most up-to-date information concerning new technology skills in word/information processing This outline can be considered a model for schools wishing to update their secretarial programs.

Secretarial Office Occupations
Revised Curriculum Outline

COURSE OUTLINE	SUGGESTED COMPLETION TIME
I. Career Objective A. Complete a self-analysis chart B. Analyze the job market C. Select a career objective	8 hours
II. Schedule Appointments A. Schedule business appointments B. Keep calendar marked with appointments for employer/supervisor C. Prepare days schedule for appointments D. Cancel and/or reschedule business appointments	2 hours
III. Receptionist Techniques A. Receive office visitors/hosting duties B. Give business information to visitors C. Screen visitors who wish to see your employer/supervisor determining who the visitor should see by deciphering his line of business D. Make appropriate introductions E. Assist visitors to proper office area F. Take and deliver business messages G. Organize tours H. Maintain log of visitors I. Maintain receptionist area J. Act as Model Office receptionist K. Act as Main Office receptionist	30-60 hours
IV. Telecommunications A. Indicate an awareness of telecommunication devices in use B. Operate a 10-button telephone and a DS console C. List procedures for: 1. Processing incoming calls 2. Processing outgoing calls 3. Transferring calls 4. Taking messages 5. Screening calls D. Maintain a record of long distance calls E. Know standard time zones	20 hours
V. Records Management A. Learn how to establish or maintain the following: 1. Alphabetic system 2. Numeric system	40 hours

        3. Geographic system
        4. Subject system
    B. Code, index, and sort business papers according to the above systems
    C. Retrieve needed information from the files
    D. Locate misfiles
    E. Establish a cross-reference listing
    F. Establish a charge-out procedure
    G. Develop procedures for transferring materials
    H. Use filing supplies and equipment safely and correctly
    I. Learn the operation of microfilming equipment

VI. Reference Materials 4 hours

    A. Locate needed information in the following reference books:
        1. Dictionary
        2. Secretarial handbooks
        3. ZIP Code directory
        4. Handbooks and procedures manuals
        5. Daily papers
        6. Trade journals

VII. Business Math Review 10-20 hours

    A. Solve math problems involving the following:
        1. Addition
        2. Subtraction
        3. Multiplication
        4. Division
        5. Fractions
        6. Percentages

VIII. Electronic Calculators 40 hours

    A. Perform basic operations such as the following:
        1. Addition
        2. Subtraction
        3. Multiplication
        4. Division
        5. Fractions
        6. Percents
        7. Average data
    B. Use a calculator to:
        1. Calculate discounts and commissions
        2. Prepare invoices
        3. Determine mark up, mark down, gross profit and net profit

COURSE OUTLINE — SUGGESTED COMPLETION TIME

   4. Compute percentage of increase, percentage of decrease, percentage distribution
   5. Prorate income and expenses
   6. Compute earned and unearned interest
   7. Determine gross pay, deductions, and net pay
   8. Calculate simple and compound interest
   9. Compute payroll
   10. Prepare bank reconciliation

IX. Accounting — 40 hours

- A. Determine the uses of accounting in the office
- B. Analyze transactions to determine whether to debit or credit
- C. Record entries in a journal
- D. Post entries to accounts
- E. Prepare a balance sheet, trial balance, income statement
- F. Make closing entries
- G. Perform operations needed to prepare payroll on the minicomputer

X. Information Processing/Microcomputers — 20 hours

- A. Develop an awareness of the uses of computers in business/industry
- B. Be aware of computer usage for routine office tasks such as mailing lists, word processing, electronic filing, etc.
- C. Prepare a mailing list on the microcomputer
- D. Use the microcomputer for electronic filing
- E. Use a visicalc program to perform routine mathematical calculations

XI. Typewriting — 40-150 hours *

- A. Operate office typewriters
  1. Non-movable carriage model
  2. Dual-pitch non-movable carriage model
  3. Self-correcting
  4. Electronic typewriters
  5. Operate memory typewriters
  6. Operate composer
- B. Format and type business documents
  1. Interoffice memo

COURSE OUTLINE | SUGGESTED COMPLETION TIME

2. Business letters
3. Minutes and reports of meetings
4. Cards
5. Labels
6. Business reports
7. Outlines
8. Agendas
9. Itineraries
10. Preprinted forms
11. Financial and tabulated reports
12. News releases

C. Make corrections using an:
   1. Eraser
   2. Correcting fluid
   3. Correction tape on typewriter
   4. Correction paper
   5. Squeezing

D. Improve typing speed and accuracy
   1. Technique improvement
   2. Keyboard review (if needed)
   3. Speed and accuracy skill building

* Hours vary due to number of competencies completed on different types of equipment.

XII. Oral Communication — 4 hours

A. Carry out written and oral instructions given by employers
B. Use effective oral communications to give clear explanation and direction

XIII. English — 40 hours

A. Use the following punctuation marks correctly:
   1. End marks
   2. Commas
   3. Miscellaneous punctuation
B. Capitalize words according to accepted standards
C. Express numbers in a format acceptable to business
D. Form plurals and possessives
E. Use homonyms correctly
F. Evaluate subject and verb agreement
G. Check for grammar and consistency in sentences and paragraphs .

COURSE OUTLINE | SUGGESTED COMPLETION TIME

XIV. Letter Writing — 30 hours

- A. Organize, write and type the following types of letters:
    1. Appointment and reservation
    2. Order
    3. Thank you
    4. Acknowledgment
    5. Inquiry

XV. Proofreading — 10 hours

- A. Locate errors in typed copy
- B. Locate errors in handwritten copy
- C. Use proofreader's marks
- D. Type corrected copy from draft
- E. Make revisions from dictated tape

XVI. Dictating and Transcribing — 40-50 hours

- A. Operate dictating/transcribing unit
- B. Transcribe from recorded dictation
- C. Edit dictated material into mailable form (Correct dictation which contains improper spelling, sentence structure, etc.)
- D. Transcribe using crt word processor
- E. Dictate material so that it may be transcribed

XVII. Information Processing/Professional Computers Dedicated Word Processors — 60-220 hours *

- A. Concepts
    1. Define word and information processing
    2. Recognize significant events in the development of word processing
    3. Identify types of equipment
    4. Recognize word processing document cycle
    5. Recognize changes in office organization
    6. Identify careers and career paths
    7. List new trends in word and information processing
- B. Operate word processing equipment
    1. Become familiar with the components of the system
    2. Interpret data on the screen
    3. Identify and define special function keys

4. Perform basic operations
5. Manage files
6. Format text
7. Edit text
8. Copy and move text
9. Perform advanced formatting
10. Perform advanced printing
11. Use typewriter feature
12. Print documents using dual column feature
13. Merge two documents
14. Sort data
15. Number paragraphs automatically
16. Generate a table of contents
17. Use calculator feature
18. Modify format lines globally
19. Generate an index by key word
20. Send messages to work stations using the mailbox
21. Perform super global replace
22. Process lists of data
23. Assemble documents from stored paragraphs
24. Verify data for correct spelling
25. Manage a data base
26. Operate multiplan
27. Display business graphics

* Students may complete the above tasks on the following types of equipment: Wang OIS 60, ABDICK Magna SL, TRS80 SuperScripsit, Eagle II Spellbinder. Students may complete competencies on more than one type of word processor. Tasks may vary depending upon type of equipment being used.

XVIII. Copy Processing — 4 hours

- A. Acquaint with different methods of copy processing
- B. Select appropriate copy method
- C. Operate the following copy processing equipment:
  1. Xerox
  2. Thermofax

XIX. Arranging Conferences and Meetings — 3 hours

- A. Schedule meetings and appointments
- B. Prepare an agenda for meetings
- C. Make necessary arrangements for meeting place, equipment, etc.
- D. Prepare minutes and follow up meeting with necessary notices

COURSE OUTLINE | SUGGESTED COMPLETION TIME

XX. Travel Arrangements — 15 hours

- A. Make travel reservations
- B. Make arrangements for company guests and/or visitors (hotels, entertainment, transportation, etc.)
- C. Prepare itineraries or schedules
- D. Prepare travel vouchers
- E. Obtain information for foreign travel
- F. Use travel information sources

XXI. Mailing and Shipping — 10 hours

- A. Process incoming mail
  - 1. Pick up incoming mail
  - 2. Open incoming mail
  - 3. Stamp incoming mail as to time and date
  - 4. Sort incoming mail for routing
  - 5. Maintain mail register
  - 6. Distribute mail
  - 7. Receive, time-stamp, and route messages
- B. Process outgoing mail
  - 1. Fold and insert letters and enclosures in mailing envelopes
  - 2. Determine postal rates and mail classification
  - 3. Sign employer's mail
  - 4. Stamp and seal envelopes
  - 5. Forward mail
  - 6. Use a postage scale to weigh items
  - 7. Compose, check, and distribute mailing lists
  - 8. Calculate postal rates

XXII. Management — 30 hours

- A. Manage the office
  - 1. Set priorities
- B. Staff the office
  - 1. Initiate or revise procedures and forms necessary for recruitment and hiring of office employees
  - 2. Prepare procedures to insure that all necessary payroll forms are completed and new employees are correctly entered on the payroll
- C. Supervise office personnel
  - 1. Delegate work to office personnel
  - 2. Evaluate performance of office personnel

COURSE OUTLINE	SUGGESTED COMPLETION TIME
XXIII. Career Planning	30 hours
A. Develop job finding skills	
B. Analyze traits and skills needed for job retention and advancement	
XXIV. Shorthand Speed Development	360 hours
A. Review of theory	
B. Skill development	
XXV. Extended Campus	10-30 hours

Students are not required to complete all of the above tasks. Students are encouraged to take proficiency tests when they have had previous experience with the subject matter.

A career choice is selected during the student's first week in the program; students are encouraged to complete tasks related to this choice.

APEX, INCORPORATED

APEX, INCORPORATED

Training will be provided in the following areas through the use of simulation.

COURSE OUTLINE	SUGGESTED COMPLETION TIME
I. Office Services Division	
A. Receptionist	30 hours
1. Operates the switchboard	
2. Greets visitors	
3. Types	
4. Takes messages	
5. Conducts tours	
6. Files all employee records	
B. Mail Clerk	30 hours
1. Dispatches mail	
2. Addresses mail	
3. Updates mail lists on microcomputer	
4. Operates mailroom equipment	
5. Substitutes for the receptionist	
C. File Clerk	30 hours
1. Files correspondence alphabetically	
2. Files mill reports numerically	
3. Files research data by subject	
4. Obtains "Request for Records Form" before releasing records	
D. Billing Clerk	30 hours
1. Prepares invoices	
2. Checks computations	
3. Routes for mailing	
E. Supply Clerk	10 hours
1. Inventories all office supplies	
2. Prepares purchase requisitions	
3. Inventories all office forms and orders new forms as needed	
4. Disburses all office supplies	
5. Substitutes for file clerk when absent	
F. Payroll Clerk	30 hours
1. Processes the following:	
a. Time cards	
b. Overtime authorization cards	
c. Notice of pay rate change	
d. Payroll checks	
e. Payroll sheets	
2. Operates the minicomputer	
II. Statistical Division	
A. Regional Clerk	30 hours

COURSE OUTLINE — SUGGESTED COMPLETION TIME

        1. Prepares the following statistical reports with the aid of a calculator and/or microcomputer:
            a. Weekly Bulletin
            b. Production Fluctuations
            c. Production to Capacity
            d. Wood Pulp Import Survey
            e. Labor and Operating Report/ All Regions
            f. Cost Fluctuations Bulletin
            g. Foreign Market Survey
    B. Statistical Typist — 30 hours
        1. Types statistical reports
        2. Answers correspondence for the statistical division
        3. Types statistical reports for the Office Information Division upon the request of his/her supervisor
    C. Machine Operator — 30 hours
        1. Operates the following equipment as requested:
            a. Photocopy equipment
            b. GBC binder
            c. Electric stapler
            d. Laminator
        2. Substitutes for absent employees in this division

III. Office Information Division

    A. Correspondence Secretary Sr. — 40 hours
        1. Transcribes reports and correspondence
        2. Types final copy from rough draft
        3. Prepares statistical reports
        4. Operates word processor
    B. Correspondence Secretary Jr. — 30 hours
        1. Answers routine correspondence
        2. Operates word processor
    C. Administrative Secretary — 30 hours
        1. Originates all paperwork for Apex subscribers
        2. Works closely with file clerk and billing clerk in processing subscriptions
        3. Releases all papers to central filing department
    D. Editor — 30 hours
        1. Dictates response to letters requiring research
        2. Uses company records to locate needed data

COURSE OUTLINE	SUGGESTED COMPLETION TIME
E. Proofreader	10 hours
1. Proofreads all outgoing correspondence	
2. Prepares word processing production reports	
3. Completes other tasks as assigned by supervisor	
IV. Division Supervisors	
A. Office Services - Office Information - Statistical	30-40 hours
1. Interviews prospective employees	
2. Processes documents to payroll and personnel	
3. Trains new employees	
4. Sets job priorities	
5. Reassigns duties as required	
6. Develops and revises job descriptions	
7. Evaluates personnel in division	
8. Conducts staff meetings	
9. Reports to office manager or assistant office manager	
V. Office Manager	30-40 hours
A. Interviews prospective employees	
B. Trains division supervisors	
C. Works closely with division supervisors in the following areas:	
1. Job training	
2. Prioritizing work	
3. Evaluating employees	
4. Organizing staff meetings	

MEDICAL

MEDICAL SECRETARY

COURSE OUTLINE	SUGGESTED COMPLETION TIME
I. Career Planning	3 hours
A. Opportunities	
B. Qualifications	
C. Professional ethics and legal responsibilities	
II. Medical Terminology	46 hours
A. Prefixes **	
B. Suffixes **	
C. Root Words **	
D. Using the medical dictionary	
E. Body regions	

** Above learning guides completed in medical assisting class

COURSE OUTLINE	SUGGESTED COMPLETION TIME
III. Secretarial Responsibilities	6 hours
A. Schedule appointments	
1. Setting up appointment books, scheduling, and rescheduling appointments	
2. Preparing appointment cards and house call slips	
B. Meet the patient	3 hours
1. Register new patients	
2. Prepare index cards	
3. Prepare referral letter	
4. Recognize emergencies	
5. Recognize patients in need of physical and emotional assistance	
C. Process telephone calls	4 hours
1. Screen calls	
2. Take messages	
3. Process incoming and outgoing calls	
D. File medical records	5 hours
1. Recognize and use filing supplies and equipment	
2. File patient records alphabetically	
3. File office records and other materials by subject	
E. Process written documents	5 hours
1. Process incoming and outgoing mail	
2. Compose and type correspondence	
3. Transcribe dictated documents	
IV. Patient Records	
A. Medical records	5 hours

COURSE OUTLINE	SUGGESTED COMPLETION TIME
1. Obtain data and prepare medical records for patients	
2. Type clinical data sheets	
B. Bill patients	4 hours
1. Type a fee schedule	
2. Compose and type a letter quoting fees	
3. Receive payments, prepare receipt, complete charge slip, post to patient's ledger account	
4. Compose and type a collection letter	
5. Identify accepted collection procedures and methods	
V. Financial Responsibilities	
A. Medical insurance	10 hours
1. Process medical forms	
a. Universal Claim	
b. Blue Cross/Blue Shield	
c. Medicare	
d. Workmen's Compensation	
2. Develop medical insurance vocabulary	
B. Prepare financial records	10 hours
1. Record entries in a daily journal	
2. Complete a monthly summary sheet	
3. Deposit checks and cash in bank	
4. Write checks	
5. Reconcile a bank statement	
6. Complete a petty cash voucher slip	
7. Write salary checks and record data on employee earnings record	
VI. Office Organization	2 hours
A. Prepare an outside services file	
B. Order medical supplies	
C. Order office supplies	
D. Prepare a schedule of office maintenance	
VII. Extended Campus	30 hours

MEDICAL TRANSCRIPTION

COURSE OUTLINE			SUGGESTED COMPLETION TIME
I.	Career Planning		3 hours
	A.	Opportunities	
	B.	Qualifications	
	C.	Professional ethics and legal responsibilities	
II.	Medical Terminology		40 hours
	A.	Prefixes **	
	B.	Suffixes **	
	C.	Roots	
III.	Anatomy and Physiology **		60 hours

** Above learning guides completed in medical assisting class.

IV.	Transcription Skill Development		146 hours
	A.	Use of medical dictionary	
	B.	Body regions	
	C.	Dermatology	
	D.	Cardiology	
	E.	Gastroenterology	
	F.	Obstetrics/Gynecology	
	G.	Endocrinology	
	H.	Orthopedics	
	I.	Ophthalmology	
	J.	Neurology	
	K.	Thoracic Medicine	
	L.	Urology	
	M.	Radiology	
	N.	Pathology	
	O.	Pediatrics	
	P.	Mental health/psychiatry	
V.	Extended Campus		40-60 hours

LEGAL

LEGAL SECRETARY/LEGAL TYPIST

COURSE OUTLINE	SUGGESTED COMPLETION TIME
I. The Law Office	2 hours
II. Office Duties	12 hours
III. History of Law	2 hours
IV. Court Structure	2 hours
V. Legal Research	4 hours

I. The Law Office — 2 hours

- A. Identify needed personal characteristics and professional skills
- B. Use professional ethics
- C. Describe professional roles
    - 1. Legal secretary
    - 2. Paralegal
    - 3. Attorney
- D. Identify professional organizations
- E. Spell and define legal terms

II. Office Duties — 12 hours

- A. Identify skills needed for processing telephone calls in a legal office
- B. Schedule appointments and keep office calendars updated for an attorney
- C. Type legal correspondence
- D. List job duties of a notary public
- E. Prepare financial records
    - 1. Docket sheets
    - 2. Petty cash vouchers
    - 3. Check disbursement requests
    - 4. Client account sheets
    - 5. Type a statement of account
- F. List and define legal terms

III. History of Law — 2 hours

- A. Identify historical origins of our legal system
- B. Differentiate between civil and criminal law
- C. Identify two levels of government
    - 1. State
    - 2. Federal
- D. List and define legal terminology

IV. Court Structure — 2 hours

- A. Prepare a chart of state and local courts
- B. List major items on the Statute of Limitations for the State of Illinois
- C. List and define legal terminology

V. Legal Research — 4 hours

- A. Identify sources of data
- B. Locate data in legal reference books

COURSE OUTLINE — SUGGESTED COMPLETION TIME

- C. Type citations
- D. Type a table of authorities
- E. Spell and define legal terms related to research

VI. Format Legal Documents — 8 hours

- A. List guidelines for preparing legal documents
- B. Type the following legal documents:
  1. Employment agreement
  2. Power of attorney
  3. Affidavit
  4. Endorsement
- C. Bind a legal document
- D. Conform a legal document
- E. Spell and define words related to the format of legal documents

VII. Civil Court Documents — 12 hours

- A. Type the following legal documents:
  1. Answer
  2. Verifications
  3. Proof of Service
  4. Type an endorsement and bind a document
  5. Notice of Motion for Change of Venue
  6. Supporting affidavit
  7. Stipulation
- B. Spell and define legal terms related to civil court documents

VIII. Real Estate — 6 hours

- A. Type legal documents:
  1. Prepare a deed
  2. Prepare a mortgage and mortgage note
  3. Opinion letter
- B. List and define real estate/legal terms

IX. Corporations — 8 hours

- A. Type corporate/legal documents
- B. Reserve a corporate name
- C. Prepare and file a charter
- D. List and define corporate legal terms

X. Wills and Probate — 20 hours

- A. Prepare wills and related documents
- B. Prepare a probate file
- C. Prepare a probate petition

- D. Prepare a notice of probate
- E. Prepare a notice to creditors
- F. Value a portfolio of securities
- G. Obtain and complete federal and state estate tax forms
- H. Prepare a release and receipt
- I. List and define legal terms related to the typing of wills and to probate

XI. Lawsuits — 40 hours

- A. Starting litigation
  - 1. Type the following documents related to start of litigation:
    - a. Complaint
    - b. Summons and cover letter
  - 2. Prepare, serve, and file a Complaint and Summons
  - 3. Prepare a Notice of Appearance
  - 4. Prepare a Stipulation Extending Time
- B. Objections, Answers, and Cross-Claims
  - 1. Type Points and Authorities
  - 2. Prepare an Answer and Counterclaim
- C. Discovery and Pretrial
  - 1. Prepare a Subpoena
  - 2. Prepare a Subpoena Duces Tecum
  - 3. Prepare a Notice to Take Deposition
  - 4. Prepare Answers to Interrogatories
- D. Concluding litigation
  - 1. Prepare a Document for Dismissal
  - 2. Prepare a Judgment on the Verdict
  - 3. Prepare a Satisfaction of Judgment
- E. Spell and define legal terms related to litigation

XII. Appeals — 8 hours

- A. Type a Notice of Appeal
- B. Type Appeal Brief
- C. Prepare a Notice to Prepare Reporter's Transcript
- D. Spell and define legal terms related to appeals

XIII. Family Law — 8 hours

- A. Prepare, serve, and file Divorce papers
- B. Prepare an Order Approving Adoption
- C. Spell and define legal terms related to family law

COURSE OUTLINE	SUGGESTED COMPLETION TIME
XIV. Office Financial Records	16 hours
A. Prepare the following financial records:	
1. Bank deposits	
2. Deposit slip	
3. Checks	
4. Bank reconciliation	
5. Payroll checks	
6. Payroll register	
B. Spell and define terms related to financial records	
XV. Extended Campus	40-60 hours

Illinois State Board of Education

Department of Adult, Vocational and Technical Education
Research and Development Section

Product Abstract

1. Title of material Secretarial Office Occupations- Listing of tasks by Job Title

2. Date material was completed April 30, 1984

3. Please check one:. New material X Revised material ____ Field-tested material ____

4. Originating agency Lake County Area Vocational Center
Address 19525 W. Washington St.
Grayslake IL
Zip Code 60030

5. Name(s) of developer(s) Ms. Janet Robinson
Address 788 Bernard Drive Buffalo Grove, IL
Zip Code 60090

6. Developed pursuant to Contract Number R-99-14-X-0313-499

7. Subject Matter (Check only one according to Department of Education Code):

Code

____ 01 Agricultural Education
X 03 Business and Office Education
____ 04 Distributive Education
____ 07 Health Occupations Education
____ 09 Home Economics Education
____ 10 Industrial Arts Education
____ 16 Technical Education
____ 17 Trade and Industrial Education
____ 22 Cooperative Education
____ Career Education
____ Other (Specify) ____

8. Education Level:

____ Pre-K Thru 6
X Post-Secondary
____ Administrator (Pre-Service)
____ 7-8
X Adult
____ 9-10
____ Teacher (Pre-service)
____ Other (Specify) ____
X 11-12

9. Intended for Use By:

X Student
____ Teacher Educator
X Classroom Teacher
____ Guidance Staff
X Local Administrator
____ State Personnel
____ Other (Specify) ____

10. Student Type:

X Regular
____ Limited-English Proficiency
X Disadvantaged
X Handicapped
____ Other (Specify) ____

11. Medium and Format of Materials:

X HARDCOPY
No. of pages 55
____ Paper bound
____ Hard bound
____ Loose-leaf
Photos: Yes ____ No ____
Diagrams: Yes ____ No ____

____ VIDEOTAPE
____ Minutes
____ B & W
____ Color
____ inches

____ FILM
____ Minutes
____ B & W
____ Color
____ mm

____ MICROFICHE
____ B & W
____ Color

N-A

___ SLIDES

No. of frames ___
___ B & W
___ Color
___ Audio
___ Carousel provided
___ Other packaging used
(Specify) ___

___ FILM STRIPS

No. of frames ___
___ B & W
___ Color
___ Audio

___ AUDIO

___ Automatic synch
___ ___ Hz
___ Manual cue
___ Reel
___ Cassette
___ Cartridge

___ OTHER

Specify:
___
___
___

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12. Availability:

___ One copy free
___ In ERIC system (No. ___)
For sale @ $ ___ per copy
___ Not available
___ Loan copy available

Contact: Name East Central Network For Curriculum Coordination Phone (217) 786-6375
Illinois Vocational Curriculum Center
Address Sangamon State University Springfield IL Zip Code 62708

13. Copyright Restrictions:

Contact: Name None Phone ( ) ___
Address ___ Zip Code ___

14. What level(s) of assistance is required to provide implementation of this outcome?

X awareness
X deciding
X understanding
X implementing

15. Are Consultive/Inservice (or staff development) available? Yes ___ No ___

Contact:
Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Research and Development Section, E-426
100 North First Street
Springfield, IL 62777
(217) 782-4620

16. General Description (State the general objective and suggested method of use. Summarize the content and tell how it is organized. Write the description so that it can be used to promote the material. Continue on back of this sheet or on another sheet, if necessary.)
Answer Below

17. Person Completing this Abstract: Richard Glogovsky

Full Address:
Lake County Area Vocational Center
19525 W. Washington St.
Grayslake, IL Zip 60030

16. This Secretarial Office Occupation, "listing of tasks" by the job titles identifies those tasks required of students interested in pursuing a specific career in the secretarial work world. This form will be helpful to the Business Education instructor in directing students toward their chosen career objectives.

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: SELECT A CAREER OBJECTIVE

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
100	SELECT A CAREER OBJECTIVE	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
100.A	Complete a self analysis chart	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
100.B	Analyze the job market	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
100.C	Select a career objective	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: SCHEDULE APPOINTMENTS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
103	SCHEDULE APPOINTMENTS															
103.A	Schedule business appointments	*			*		*	*		*			*		*	
103.B	Keep a calendar marked with appointments for employer/supervisor	*			*		*	*		*			*		*	
103.C	Prepare days schedule for appointments	*			*		*	*		*			*		*	
103.D	Cancel and/or reschedule business appointments	*			*		*	*		*			*		*	

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM RECEPTIONIST DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
104	PERFORM RECEPTIONIST DUTIES															
104.A	Receive office visitors/hosting duties	*			*		*	*					*		*	
104.B	Give business information to visitors	*			*		*	*					*		*	
104.C	Screen visitors	*			*		*	*					*		*	
104.D	Make appropriate introductions	*			*		*	*					*		*	
104.E	Assist visitors to proper office area	*			*		*	*					*		*	
104.F	Take and deliver business messages	*			*		*	*					*		*	
104.G	Organize tours	*			*			*								
104.H	Maintain a log of visitors	*			*			*								
104.I	Maintain receptionist area	*			*		*	*					*		*	
104.J	Act as Model Office receptionist	*			*		*	*					*		*	
104.K	Act as Main Office receptionist							*								

*Word Processing

CIP CODE CLASSIFICATION

07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: IDENTIFY TELECOMMUNICATIONS PROCEDURES AND OPERATE TELECOMMUNICATIONS EQUIPMENT

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
105	IDENTIFY TELECOMMUNICATIONS PROCEDURES AND OPERATE TELECOMMUNICATIONS EQUIPMENT	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
105.A	Indicate an awareness of telecommunication devices in use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
105.B	Operate a 10-button telephone and a DS console							*								
105.C	List procedures for processing calls, taking messages, and screening calls	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
105.D	Maintain a record of long distance calls	*	*	*	*	*	*	*	*	*	*		*	*	*	*
105.E	Know standard time zones	*	*	*	*	*	*	*	*	*	*		*	*	*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS .
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM RECORDS MANAGEMENT DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
106	PERFORM RECORDS MANAGEMENT DUTIES															
106.A	Learn how to establish or maintain an alphabetic, numeric, geographic, and subject filing system	*	*	*	*	*	*	*	*	*	*		*	*	*	*
106.B	Code, index, and sort business papers	*	*	*	*	*	*	*	*	*	*		*	*	*	*
106.C	Retrive materials from the files	*	*	*	*	*	*	*	*	*	*		*	*	*	*
106.D	Locate misfiles	*	*	*	*	*	*	*	*	*	*		*	*	*	*
106.E	Establish a cross-reference listing	*	*	*	*	*	*	*	*	*	*		*	*	*	*
106.F	Establish and use a charge-out system								*							
106.G	Develop procedures for transferring materials								*							
106.H	Use filing supplies and equipment safely and correctly	*	*	*	*	*	*	*	*	*	*		*	*	*	*
106.I	Learn the operation of microfilming equipment	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: USE REFERENCE MATERIALS

Task No:	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
108	USE REFERENCE MATERIALS															
108.A	Locate materials in these reference books: Dictionaries, secretarial handbooks, ZIP CODE directories, handbooks and procedures manuals, daily papers, trade journals	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: SOLVE BUSINESS MATH PROBLEMS - A REVIEW

Task No.	Task Description	Administrative Assistant with WP* support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary	Data Systems Clerk 15
110	SOLVE BUSINESS MATH PROBLEMS															
110.A	Solve math problems involving addition, subtraction, multiplication, division, and percentages manually	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: OPERATE AN ELECTRONIC CALCULATOR TO PERFORM MATHEMATICAL CALCULATIONS USED IN BUSINESS

Task No.	Task Description	Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
120	OPERATE AN ELECTRONIC CALCULATOR															
120.A	Perform basic operations such as addition, subtraction, miltiplication, division, convert fractions to decimals, calculate percentages, and average data	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
120.B	Use a calculator to															
120.B.1	Calculate discounts and commissions	*								*	*		*		*	*
120.B.2	Prepare invoices	*			*		*			*	*		*		*	*
120.B.3	Determine mark up, mark down, gross profit, and net profit	*								*			*		*	*
120.B.4	Compute percentage of increase, decrease and distribution	*								*			*		*	*
120.B.5	Prorate income and expenses	*								*			*		*	*
120.B.6	Compute earned and unearned interest	*								*			*		*	*
120.B.7	Determine gross pay, deductions, and net pay	*			*		*			*			*		*	*

*Word Processing

CIP CODE CLASSIFICATION
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: OPERATE AN ELECTRONIC CALCULATOR TO PERFORM MATHEMATICAL CALCULATIONS USED IN BUSINESS (Continued)

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
120.B.8	Calculate simple and compound interest	*								*			*		*	*
120.B.9	Compute payroll	*			*		*			*			*		*	*
120.B.10	Prepare a bank reconciliation	*			*		*			*			*		*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: FOLLOW BASIC ACCOUNTING PROCEDURES

Task No.	Task Description	Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
131	FOLLOW BASIC ACCOUNTING PROCEDURES															
131.A	Determine the uses of accounting in the office	*			*		*			*			*		*	*
131.B	Analyze transactions to determine whether to debit or credit	*			*		*			*			*		*	*
131.C	Record entries in a journal	*			*		*			*			*		*	*
131.D	Post entries to accounts	*			*		*			*			*		*	*
131.E	Prepare a balance sheet, trial balance, and income statement	*			*		*			*			*		*	*
131.F	Make closing entries	*			*		*			*			*		*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: RECOGNIZE BASIC MICROCOMPUTER CONCEPTS AND OPERATE COMMONLY AVAILABLE SOFTWARE PROGRAMS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
141	INFORMATION PROCESSING/MICROCOMPUTERS															
141.A	Develop an awareness of the uses of microcomputers in business and industry	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
141.B	Be aware of computer usage for routine office tasks such as mailing lists, word processing, electronic filing (data base management), etc.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
141.C	Prepare a mailing list on the microcomputer	*	*	*	*		*		*	*	*		*		*	*
141.D	Use the microcomputer for data base management	*	*	*	*		*		*	*	*		*		*	*
141.E	Use a visicalc program to perform routine mathematical functions such as addition	*			*					*					*	*
141.F	Operate a payroll program on the microcomputer									*						*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: OPERATE OFFICE TYPEWRITERS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
148.A	OPERATE OFFICE TYPEWRITERS															
148.A.1	Operate non-movable carriage typewriters	*	*	*	*	*	*	*	*	*	*		*	*	*	
148.A.2	Operate dual-pitch non-movable typewriters	*	*	*	*	*	*	*	*	*	*		*	*	*	
148.A.3	Operate self-correcting typewriters	*	*	*	*	*	*	*	*	*	*		*	*	*	
148.A.4	Operate electronic typewriters	*	*	*	*	*	*	*	*	*	*		*	*	*	
148.A.5	Operate memory typewriters	*	*	*	*	*	*						*		*	
148.A.6	Operate electronic selectric composer		*													

*Word Processing

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SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: FORMAT AND TYPE BUSINESS DOCUMENTS ON A TYPEWRITER OR WORD PROCESSOR

Task No.	Task Description	Administrative Assistant with WP* support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 1	Data Systems Clerk 15
148.B	FORMAT AND TYPE BUSINESS DOCUMENTS AS LISTED BELOW:															
148.B.1	Interoffice memorandum	*	*	*	*		*	*	*	*	*		*	*	*	*
148.B.2	Business letters	*	*	*	*		*	*	*	*	*		*	*	*	*
148.B.3	Minutes and reports of meetings	*	*	*	*		*	*		*			*	*	*	
148.B.4	Cards	*	*	*	*		*	*	*	*	*		*	*	*	
148.B.5	Labels	*	*	*	*	*	*	*	*	*	*		*	*	*	*
148.B.6	Business reports	*	*	*	*	*	*	*		*			*	*	*	
148.B.7	Outlines	*	*	*	*		*	*		*			*	*	*	
148.B.8	Agendas	*	*	*	*		*	*		*			*	*	*	
148.B.9	Itineraries	*	*	*	*		*	*		*			*	*	*	
148.B.10	Preprinted forms (Fill in)	*	*	*	*		*	*	*	*	*		*	*	*	*
148.B.11	Financial and tabulated reports	*	*	*	*		*	*	*	*	*		*	*	*	*
148.B.12	News releases	*	*	*	*			*		*			*	*	*	

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: MAKE CORRECTIONS ON A TYPEWRITER

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
148.C	MAKE CORRECTIONS ON A TYPEWRITER USING THE FOLLOWING DEVICES AND TECHNIQUES															
148.C.1	Eraser	*	*	*	*	*	*	*	*	*	*		*	*	*	
148.C.2	Correction fluid	*	*	*	*	*	*	*	*	*	*		*	*	*	
148.C.3	Correction tape on a typewriter	*	*	*	*	*	*	*	*	*	*		*	*	*	
148.C.4	Correction or cover-up tape	*	*	*	*	*	*	*	*	*	*		*	*	*	
148.C.5	Spreading and crowding	*	*	*	*	*	*	*	*	*	*		*	*	*	

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: IMPROVE TYPING SPEED AND ACCURACY

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
148.D	IMPROVE TYPING SPEED AND ACCURACY															
148.D.1	Improve typing or keyboarding techniques	*	*	*	*	*	*	*	*	*	*		*	*	*	*
148.D.2	Review finger positions (when needed)	*	*	*	*	*	*	*	*	*	*		*	*	*	*
148.D.3	Improve both typing or keyboarding speed and accuracy	*	*	*	*	*	*	*	*	*	*		*	*	*	*

*Word Processing

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SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: IMPROVE ORAL COMMUNICATION SKILLS

Task No.	Task Description	Administrative Assistant with WP* support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 14	Data Systems Clerk 15
149	IMPROVE ORAL COMMUNICATION SKILLS															
149.A	Carry out oral instructions given by employer	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
149.B	Use effective oral communications to give clear explanations and directions	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: IMPROVE ENGLISH GRAMMAR SKILLS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
150	IMPROVE ENGLISH GRAMMAR SKILLS															
150.A.1	Use end marks correctly	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150.A.2	Use commas where needed	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150.A.3	Use colons, semicolons, dashes, hyphens, etc. where needed	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150.B	Capitalize words according to accepted standards	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150.C	Express numbers in a format acceptable to business	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150.D	Form the plural and/or possessive of nouns	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150.E	Use homonyms correctly	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150.F	Evaluate subject and verb agreement	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150.G	Check for grammar and consistency in sentences and paragraphs	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

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SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: ORGANIZE, TYPE, AND WRITE BUSINESS LETTERS OF A ROUTINE NATURE

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
155.A	ORGANIZE, TYPE, AND WRITE BUSINESS LETTERS															
155.A.1	Appointment and reservation letters	*			*					*			*	*	*	
155.A.2	Order letters	*			*					*			*	*	*	
155.A.3	Thank you letters	*			*					*			*	*	*	
155.A.4	Acknowledgment letters	*			*					*			*	*	*	
155.A.5	Inquiry letters	*			*					*			*	*	*	

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PROOFREAD DOCUMENTS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
158	PROOFREAD BUSINESS DOCUMENTS															
158.A	Locate errors in typed copy	*	*	*	*	*	*	*	*	*	*		*	*	*	*
158.B	Locate errors in handwritten copy	*	*	*	*	*	*	*	*	*	*		*	*	*	*
158.C	Use proofreader's marks	*	*	*	*	*	*	*	*	*	*		*	*	*	*
158.D	Make a corrected copy from draft	*	*	*	*	*	*	*	*	*	*		*	*	*	*
158.E	Make revisions from dictated tape	*	*	*	*	*	*	*	*	*	*		*	*	*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: TRANSCRIBE AND DICTATE BUSINESS DOCUMENTS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
160	TRANSCRIBE AND DICTATE BUSINESS DOCUMENTS															
160.A	Operate dictating/transcribing unit	*	*	*	*	*	*			*			*		*	
160.B	Transcribe from recorded dictation	*	*	*	*	*	*			*			*		*	
160.C	Edit dictated material into mailable form	*	*	*	*	*	*			*			*		*	
160.D	Transcribe using CRT word processor	*	*	*	*	*	*			*			*		*	
160.E	Dictate material so that it may be transcribed	*													*	

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: IDENTIFY INFORMATION AND WORD PROCESSING CONCEPTS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
170.A	IDENTIFY INFORMATION AND WORD PROCESSING CONCEPTS															
170.A.1	Define word and information processing	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
170.A.2	Recognize significant events in the development of information and word processing	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
170.A.3	Identify types of equipment used	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
170.A.4	Recognize the document cycle	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
170.A.5	Recognize changes in office organization	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
170.A.6	Identify careers and career paths	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
170.A.7	List new trends in information and word processing	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

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SECRETARIAL [illegible]ICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: OPERATE INFORMATION PROCESSING EQUIPMENT

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
170 B	OPERATE INFORMATION PROCESSING EQUIPMENT															
170.B.1	Become familiar with the components of the system	*	*	*	*	*	*	*	*	*	*		*	*	*	*
170.B.2	Interpret data on the screen	*	*	*	*	*	*	*	*	*	*		*	*	*	*
170.B.3	Identify and define special function keys	*	*	*	*	*	*	*	*	*	*		*	*	*	*
170.B.4	Perform basic operations	*	*	*	*	*	*	*	*	*	*		*	*	*	*
170.B.5	Manage files	*	*	*	*	*	*	*	*	*	*		*	*	*	*
170.B.6	Format text	*	*	*	*	*	*	*	*	*	*		*	*	*	*
170.B.7	Edit text	*	*	*	*	*	*	*	*	*	*		*	*	*	*
170.B.8	Copy and move text	*	*	*	*	*	*	*	*	*	*		*	*	*	*
170.B.9	Perform advanced formatting		*		*	*									*	*
170.B.10	Perform advanced printing		*		*	*									*	*
170.B.11	Use typewriter feature		*		*	*									*	*
170.B.12	Print documents using dual column feature		*												*	
170.B.13	Merge two documents	*	*		*	*									*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: OPERATE INFORMATION PROCESSING EQUIPMENT

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
170.B.14	Sort data		*		*										*	*
170.B.15	Number paragraphs automatically		*		*										*	
170.B.16	Generate a table of contents		*		*										*	
170.B.17	Use calculator feature		*		*										*	*
170.B.18	Modify format lines globally		*		*										*	
170.B.19	Generate an index by key word		*		*										*	
170.B.20	Send messages to the work station using the mailbox	*	*		*										*	*
170.B.21	Perform super global replace		*		*										*	
170.B.22	Process lists of data	*	*		*										*	*
170.B.23	Assemble documents from stored paragraphs	*	*		*										*	
170.B.24	Verify data for correct spelling	*	*		*										*	
170.B.25	Manage a data base	*	*		*				*						*	*
170.B.26	Operate multiplan	*	*												*	*
170.B.27	Display business graphics	*	*												*	*

*Word Processing

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SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: OPERATE COPY PROCESSING EQUIPMENT

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
180	OPERATE COPY PROCESSING EQUIPMENT															
180.A	Recognize methods of copy processing	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
180.B	Select appropriate copy method	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
180.C	Operate the following equipment:															
180.C.1	Xerox	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
180.C.2	Thermofax	*			*		*			*		*	*		*	

*Word Processing

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SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: ARRANGE CONFERENCES AND MEETINGS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
188	ARRANGE CONFERENCES AND MEETINGS															
188.A	Schedule meetings and appointments	*			*		*						*		*	
188.B	Prepare an agenda for a meeting	*			*		*						*		*	
188.C	Make necessary arrangements for meeting place, equipment, etc.	*			*		*						*		*	
188.D	Prepare minutes and follow up meeting with necessary notices	*			*		*						*		*	

*Word Processing

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SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: MAKE TRAVEL ARRANGEMENTS

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
189	MAKE TRAVEL ARRANGEMENTS															
189.A	Make travel reservations	*			*		*						*		*	
189.B	Make arrangements for company guests, hotels transportation, etc.	*			*		*						*		*	
189.C	Prepare itineraries or schedules	*			*		*						*		*	
189.D	Prepare travel vouchers	*			*		*						*		*	
189.E	Obtain information for foreign travel	*			*		*						*		*	
189.F	Use travel information sources	*			*		*						*		*	

*Word Processing

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SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PROCESS INCOMING AND OUTGOING MAIL

Task No.	Task Description	Administrative Assistant with WP* support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 14	Data Systems Clerk 15
190	PROCESS INCOMING AND OUTGOING MAIL															
199.A	Process incoming mail	*			*		*			*	*				*	
	Pick up incoming mail	*			*		*			*	*				*	
	Open incoming mail	*			*		*			*	*				*	
	Stamp incoming mail	*			*		*			*	*				*	
	Sort incoming mail for routing	*			*		*			*	*				*	
	Maintain a mail register	*			*		*			*	*				*	
	Distribute mail	*			*		*			*	*				*	
	Receive, time-stamp, and route messages	*			*		*			*	*				*	
199.B	Process outgoing mail															
	Fold and insert letters and enclosures in mailing envelopes	*			*		*			*	*				*	
	Determine postal rates and mail classifications	*			*		*			*	*				*	
	Sign employer's mail	*			*		*			*		*			*	

*Word Processing

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SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PROCESS INCOMING AND OUTGOING MAIL

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
190.B	Stamp and seal envelopes	*			*		*			*	*				*	
	Forward mail	*			*		*			*	*				*	
	Use a postage scale to weigh items	*			*		*			*	*				*	
	Compose, check, and distribute mailing lists	*			*		*			*	*				*	
	Calculate postal rates	*			*		*			*	*				*	
190.C	Address outgoing mail for OCR	*	*	*	*	*	*	*	*	*	*		*	*	*	*
190.D	Process a bulk mailing	*								*	*		*		*	

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS (INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM MANAGEMENT TASKS

Task No.	Task Description	Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
200	PERFORM MANAGEMENT TASKS															
200.A	Manage the office	*													*	
200.A.1	Set priorities	*													*	
200.B	Staff the office	*													*	
200.B.1	Initiate and revise recruitment forms	*													*	
200.B.2	Prepare procedures to insure employees are correctly entered on the payroll	*													*	
200.C	Supervise office personnel	*													*	
200.C.1	Delegate work to office personnel	*													*	
200.C.2	Evaluate performance of office personnel	*													*	

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: DESCRIBE SKILLS REQUIRED TO GET A JOB

Task No.	Task Description	Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
400	DESCRIBE SKILLS REQUIRED TO GET A JOB															
400.A	Develop job finding skills	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
400.B	Analyze traits and skills needed for job retention and advancement	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM MEDICAL SECRETARIAL AND TRANSCRIPTIONIST DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
501	Identify job opportunities					*	*									
502	Determine career qualifications					*	*									
503	Locate medical terms in a medical dictionary					*	*									
504	Identify body regions					*	*									
	Transcribe medical records related to the following areas of specialization					*										
505	Dermatology					*										
506	Cardiology					*										
507	Gastroenterology					*										
508	Obstetrics/Gynecology					*										
509	Endocrinology					*										
510	Orthopedics					*										
511	Ophthalmology					*										
512	Neurology					*										
513	Thoracic Medicine					*										

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

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DUTY: PERFORM MEDICAL SECRETARIAL AND TRANSCRIPTIONIST DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
514	Urology					*										
515	Radiology					*										
516	Pathology					*										
517	Pediatrics					*										
518	Mental health/psychiatry					*										
525	Identify professional ethics and legal responsibilities					*	*									
526	Schedule appointments						*									
526.1	Set up appointment book, schedule and reschedule appointments						*									
526.2	Prepare appointment cards and house call slips						*									

*Word Processing

CIP CODE CLASSIFICATION
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM MEDICAL SECRETARIAL AND TRANSCRIPTIONIST DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
527	Meet the patient						*									
527.1	Register new patients						*									
527.2	Prepare index cards						*									
527.3	Prepare referral letters						*									
527.4	Recognize emergencies						*									
527.5	Recognize patients in need of physical and emotional assistance						*									
528	Process telephone calls						*									
528.1	Screen calls						*									
528.2	Take messages						*									
528.3	Process incoming and outgoing calls						*									
529	File medical records						*									
529.1	Recognize and use filing supplies and equipment						*									
529.2	File patient records alphabetically						*									

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM MEDICAL SECRETARIAL AND TRANSCRIPTIONIST DUTIES

Task No.	Task Description	Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
529.3	File office records and other materials by subject						*									
530	Process written documents						*									
530.1	Process incoming and outgoing mail						*									
530.2	Compose and type correspondence						*									
530.3	Transcribe dictated letters						*									
531	Prepare medical records						*									
531.1	Obtain data and prepare medical records for patients						*									
531.2	Type clinical data sheets						*									

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM MEDICAL SECRETARIAL AND TRANSCRIPTIONIST DUTIES

Task No.	Task Description	Administrative Assistant with WP* support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 1	Executive Secretary 14	Data Systems Clerk 15
532	Bill patients						*									
532.1	Type a fee schedule						*									
532.2	Compose and type a letter quoting fees						*									
532.3	Receive payments, prepare receipts, complete charge slips, post to patients' ledger accounts						*									
532.4	Compose and type a collection letter						*									
532.5	Identify accepted collection procedures and methods						*									
533	Prepare medical insurance forms						*									
533.1	Process the following medical forms:						*									
	Universal Claim, Blue Cross/Shield, Medicare, Workmen's Compensation						*									
533.2	Develop medical insurance vocabulary						*									

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM MEDICAL SECRETARIAL AND TRANSCRIPTIONIST DUTIES

Task No.	Task Description	Administrative Assistant with WP support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 14	Data Systems Clerk 15
534	Prepare financial records						*									
534.1	Record entries in a daily journal						*									
534.2	Complete a monthly summary sheet						*									
534.3	Deposit checks and cash in bank						*									
534.4	Write checks						*									
534.5	Reconcile a bank statement						*									
534.6	Complete a petty cash voucher						*									
534.7	Write salary checks and record data on employee earnings record						*									
535	Organize the office						*									
535.1	Prepare an outside services file						*									
534.2	Order medical supplies						*									
534.3	Order office supplies						*									
534.4	Prepare a schedule of office maintenance						*									

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: MEDICAL TERMINOLOGY AND ANATOMY AND PHYSIOLOGY*

Task No.	Task Description	Administrative Assistant with WP support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	Proofreader	14 Executive Secretary	15 Data Systems Clerk
	Spell, describe, and define medical prefixes root words and suffixes					*	*									
	Spell, describe, and define words related to anatomy and physiology					*	*									

*The above tasks are completed in the Medical Assisting program.

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	Administrative Assistant with WP support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 14	Data Systems Clerk 15
700	Recognize the character of the legal profession				*											
700.A	Identify needed personal characteristics and				*											
	professional skills				*											
700.B	Use professional ethics				*											
700.C	Describe professional roles				*											
700.D	Identify professional organizations				*											
700.E	Spell and define related legal terms				*											
701	Perform legal office duties				*											
701.A	Identify skills needed for processing calls				*											
701.B	Schedule appointments and keep calendar				*											
701.C	Type legal correspondence				*											
701.D	List job duties of a notary public				*											
701.E	Prepare financial records				*											
701.F	Spell and define related legal terms				*											

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	Administrative Assistant with WP support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 14	Data Systems Clerk 15
702	Describe the history of our legal system				*											
702.A	Identify historical origins of our legal system				*											
702.B	Differentiate between civil and criminal law				*											
702.C	Identify two levels of government				*											
702.D	List and define related legal terms				*											
703	Describe court structure				*											
703.A	Prepare a chart of state and local courts				*											
702.B	List major items on the Statute of Limitations				*											
702.C	List and define related legal terminology				*											
704	Perform legal research duties				*											
704.A	Identify sources of data				*											
704.B	Locate data in legal reference books				*											
704.C	Type citations				*											

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	Administrative Assistant with WP support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
704.D	Type a table of authorities				*											
704.E	Spell and define related legal terms				*											
705	Format legal documents		*	*	*											
705.A	List guidelines for preparing legal documents		*	*	*											
705.B	Type legal documents - affidavit, agreements power of attorney, endorsement		*	*	*											
705.C	Bind a legal document		*	*	*											
705.D	Conform a legal document		*	*	*											
705.E	Spell and define related legal terms		*	*	*											

CIP CODE CLASSIFICATION
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
706	Format Civil Court documents		*	*	*											
706.A.1	Type an answer, verification, proof of service, type an endorsement and bind a document		*	*	*											
706.A.2	Type a motion for change of venue, supporting affidavit, and stipulation		*	*	*											
706.B	Spell and define related legal terms		*	*	*											
707	Format legal documents related to real estate		*	*	*											
707.A	Type a deed, mortage and mortage note, and an opinion letter		*	*	*											
707.B	Spell and define legal terms related to the area of real esatte		*	*	*											

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
708	Format corporate legal documents		*	*	*											
708.A	Type a letter to reserve a corporate name, prepare and file a charter		*	*	*											
708.B	List and define corporate legal terms		*	*	*											
709	Format wills and related documents		*	*	*											
709.A	Prepare wills and related documents		*	*	*											
709.B	Prepare a probate file				*											
709.C	Prepare a probate petition				*											
709.D	Prepare a notice of probate				*											
709.E	Prepare a notice to creditors				*											
709.F	Value a portfolio of securities				*											
709.G	Obtain and complete federal and state estate tax forms				*											
709.H	Prepare a release and receipt				*											

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
709.I	List and define legal terms related to the typing of wills and probate documents		*	*	*											
710.A	Prepare documents related to the start of litigation				*											
710.A.1	Type a complaint, summons and a cover letter				*											
710.A.2	Prepare, serve, and file a complaint and a summons				*											
710.A.3	Prepare a notice of appearance				*											
710.A.4	Prepare a stipulation extending time				*											
710.B	Prepare objections, answers, and cross-claims				*											
710.B.1	Type points and authorities				*											
710.B.2	Prepare an answer and cross-claim				*											

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	Executive Secretary	15 Data Systems Clerk
710.C	Prepare documents related to discovery and pre-trial				*											
710.C.1	Prepare a subpoena				*											
710.C.2	Prepare a subpoena Duces Tecum				*											
710.C.3	Prepare a notice to take deposition				*											
710.C.4	Prepare answers to interrogatories				*											
710.D	Prepare documents related to concluding litigation				*											
710.D.1	Prepare a document for dismissal				*											
710.D.2	Prepare a judgment on the verdict				*											
710.D.3	Prepare a satisfaction of judgment				*											
710.E	Spell and define legal terms related to litigation				*											

*Word Processing

CIP CODE [illegible]
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	Administrative Assistant with WP* support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 14	Data Systems Clerk 15
711	Prepare legal documents related to appeals				*											
711.A	Type a notice of appeal				*											
711.B	Type appeal brief				*											
711.C	Prepare a notice to prepare reporter's transcript				*											
711.D	Spell and define legal terms related to appeals				*											
712	Prepare legal documents related to family law				*											
712.A	Prepare, serve, and file divorce papers				*											
712.B	Prepare an order approving adoption				*											
712.C	Spell and define related legal terms				*											

*Word Processing

CIP CODE CLASSIFICATION
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM LEGAL SECRETARIAL DUTIES

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
713	Prepare financial records related to the legal office				*											
713.A	Prepare the following financial records: Bank deposits, deposit slips, checks, bank reconciliations, payroll checks, payroll register				*											
713.B	Spell and define related legal terms				*											

*Word Processing

CIP CODE CLASSIFICATION
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: DEVELOP SHORTHAND SPEED

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	1 Executive Secretary	15 Data Systems Clerk
800	DEVELOP SHORTHAND SPEED				*								*		*	
800.A	Review shorthand theory				*								*		*	
800.B	Develop shorthand dictation and transcription skills															

*Word Processing

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM JOB DUTIES IN SIMULATED COMPANY - APEX OFFICE SERVICES DIVISION

Task No.	Task Description	Administrative Assistant with WP support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	Proofreader	14 Executive Secretary	15 Data Systems Clerk
901.A	Perform receptionist duties															
901.A.1	Operate the switchboard	*						*		*	*				*	
901.A.2	Greet visitors	*						*		*	*				*	
901.A.3	Type	*						*		*	*				*	
901.A.4	Take messages	*						*		*	*				*	
901.A.5	Conduct tours	*						*		*	*				*	
901.A.6	File employee records	*						*		*	*				*	
901.B	Perform mail clerk duties															
901.B.1	Dispatch mail									*	*					*
901.B.2	Address mail									*	*					*
901.B.3	Update mail list on microcomputer									*	*					*
901.B.4	Operate mailroom equipment									*	*					*
901.B.5	Substitute for the receptionist									*	*					*

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM JOB DUTIES IN SIMULATED COMPANY - APEX OFFICE SERVICES DIVISION

Task No.	Task Description	Administrative Assistant with WP support	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 14	Data Systems Clerk 15
901.C	Perform file clerk duties															
901.C.1	File correspondence alphabetically	*			*		*		*	*					*	*
901.C.2	File mill reports and correspondence numerically (Access with data base software program)	*			*		*		*	*					*	*
901.C.3	File research data by subject	*			*		*		*	*					*	*
901.C.4	Obtain request for records before releasing data	*			*		*		*	*					*	*
901.D	Perform billing clerk duties									*						*
901.D.1	Prepare invoices									*						*
901.D.2	Check computations									*						*
901.D.3	Route for mailing									*						*

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM JOB DUTIES IN SIMULATED COMPANY - APEX OFFICE SERVICES DIVISION

Task No.	Task Description	1 Administrative Assistant with WP support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
901.E.	Perform supply clerk duties															
901.E.1	Inventory all office supplies									*						
901.E.2	Prepare purchase requisition									*						
901.E.3	Inventory all office forms and reorder as needed									*						
901.E.4	Disburse all office supplies									*						
901.E.5	Substitute for file clerk when absent									*						
901.F	Perform payroll duties															
901.F.1	Process the following: Time cards, overtime authorization, notice of pay rate change, payroll checks, employee earnings records									*						*
901.F.2	Operate the microcomputer to prepare payroll									*						*

CIP CODE CLASSIFICATION
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM JOB DUTIES IN SIMULATED COMPANY - APEX STATISTICAL DIVISION

Task No.	Task Description	Administrative Assistant with WP support 1	Word Processing Specialist 2	Typist 3	Legal Secretary 4	Medical Transcriptionist 5	Medical Records Secretary 6	Receptionist/Communications System Operator 7	File Clerk/Information Specialist 8	General Office Clerk 9	Mail and Order Clerk 10	Reprographics Clerk 11	Stenographer 12	Proofreader 13	Executive Secretary 14	Data Systems Clerk 15
902.A	Regional clerk (Statistical Clerk)															
902.A.1	Prepare statistical reports with the aid of a calculator or microcomputer									*						*
902.B	Perform statistical typist duties															
902.B 1-3	Type statistical reports of a various nature		*	*											*	
902.C	Perform machine operator duties on reprographics equipment															
902.C.1	Operate photocopy equipment, GBC, laminator									*		*				

CIP CODE CLASSIFICATION
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM OFFICE DUTIES IN SIMULATED COMPANY - APEX OFFICE INFORMATION DIVISION

Task No.	Task Description	1 Administrative Assistant with WP support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
903.A	Perform correspondence secretary duties															
903.A.1	Transcribe reports and type correspondence		*	*	*								*		*	
902.A.2	Type final copy from rough draft		*	*	*								*		*	
902.A.3	Prepare statistical reports		*	*	*								*		*	
902.A.4	Operate word processing equipment		*	*	*								*		*	
902.B.	Perform correspondence junior duties															
902.B.1	Answer routine correspondence		*	*	*								*		*	
902.B.2	Operate word processing equipment		*	*	*								*		*	
902.C	Perform administrative secretarial duties															
902.C.1	Originate paperwork for Apex subscribers	*													*	
902.C.2	Work closely with file clerk and billing clerk															
	in processing subscriptions	*													*	
902.C.3	Release all papers to the central filing dept.	*													*	

SECRETARIAL [illegible]ICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM JOB DUTIES IN SIMULATED COMPANY - APEX OFFICE INFORMATION DIVISION

Task No.	Task Description	Administrative Assista[illegible] with WP support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
903.D	Perform copy clerk and editing duties															
903.D.1	Dictate response to letters requiring research	*											*		*	
903.D.2	Use company records to locate needed data	*											*		*	
903.E	Perform proofreading duties															
903.E.1	Proofread all outgoing correspondence	*	*	*	*	*	*	*		*	*		*	*	*	*
903.E 2	Prepare word processing production reports	*	*	*	*	*	*	*		*	*		*	*	*	*
903.E.3	Complete tasks as assigned															

SECRETARIAL [illegible]ICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PERFORM JOB DUTIES IN SIMULATED COMPANY - APEX MANAGEMENT POSITIONS

Task No.	Task Description	Administrative Assista with WP support 1	Word Processing Specialist 2	Typist 3	Legal Secretary	Medical Transcriptionist	Medical Records Secretary	Receptionist/Communications System Operator	File Clerk/Information Specialist	General Office Clerk	Mail and Order Clerk	Reprographics Clerk	Stenographer	Proofreader	Executive Secretary	Data Systems Clerk
904.A	Perform division supervisor duties															
904.A.1	Interview prospective employees	*													*	
904.A.2	Process documents to payroll and personnel	*													*	
904.A.3	Train new employees	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
904.A.4	Set job priorities	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
904.A.5	Reassign duties as required	*													*	
904.A.6	Develop and revise job descriptions	*													*	
904.A.7	Evaluate personnel	*													*	
904.A.8	Conduct staff meetings	*													*	
904.A.9	Report to office manager	*													*	
905	Perform office managerial duties															
905.A	Interview prospective employees	*													*	
905.B	Train division supervisors	*													*	
905.C	Work closely with divisions supervisors	*													*	

CIP CODE CLASSIFICATION
07.0601

SECRETARIAL OFFICE OCCUPATIONS
(INFORMATION/WORD PROCESSING)

Listing of Tasks by Job Title

DUTY: PARTICIPATE IN EXTENDED CAMPUS PROGRAM

Task No.	Task Description	1 Administrative Assistant with WP* support	2 Word Processing Specialist	3 Typist	4 Legal Secretary	5 Medical Transcriptionist	6 Medical Records Secretary	7 Receptionist/Communications System Operator	8 File Clerk/Information Specialist	9 General Office Clerk	10 Mail and Order Clerk	11 Reprographics Clerk	12 Stenographer	13 Proofreader	14 Executive Secretary	15 Data Systems Clerk
1000	Visit extended campus site and complete tasks as assigned by employer	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Observe office environment, flow of work, equipment used, etc.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Experience an office interview	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Prepare extended campus report	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Word Processing

Illinois State Board of Education

Department of Adult, Vocational and Technical Education
Research and Development Section

Product Abstract

1. Title of material Student Learning Guide (Create and Print a document on the OIS 60)

2. Date material was completed May 17, 1984

3. Please check one: New material X Revised material ____ Field-tested material ____

4. Originating agency Lake County Area Vocational Center

Address 19525 W. Washington St. Grayslake, IL Zip Code 60030

5. Name(s) of developer(s) Janet Robinson

Address 788 Bernard Dr. Buffalo Grove, IL Zip Code 60090

6. Developed pursuant to Contract Number R-99-14-X-0313-499

7. Subject Matter (Check only one according to Department of Education Code):

Code

____ 01 Agricultural Education
X 03 Business and Office Education
____ 04 Distributive Education
____ 07 Health Occupations Education
____ 09 Home Economics Education
____ 10 Industrial Arts Education
____ 16 Technical Education
____ 17 Trade and Industrial Education
____ 22 Cooperative Education
____ Career Education
____ Other (Specify) ____

8. Education Level:

____ Pre-K Thru 6
____ 7-8
____ 9-10
X 11-12
X Post-Secondary
X Adult
____ Teacher (Pre-service)
____ Administrator (Pre-Service)
____ Other (Specify) ____

9. Intended for Use By:

X Student
X Classroom Teacher
X Local Administrator
____ Teacher Educator
____ Guidance Staff
____ State Personnel
____ Other (Specify) ____

10. Student Type:

X Regular
____ Disadvantaged
____ Handicapped
____ Limited-English Proficiency
____ Other (Specify) ____

11. Medium and Format of Materials:

X HARDCOPY
No. of pages 17
X Paper bound
____ Hard bound
____ Loose-leaf
Photos: Yes ____ No ____
Diagrams: Yes ____ No ____

____ VIDEOTAPE
____ Minutes
____ B & W
____ Color
____ inches

____ FILM
____ Minutes
____ B & W
____ Color
____ mm

____ MICROFICHE
____ B & W
____ Color

N-A

____ SLIDES ____ FILM STRIPS ____ AUDIO ____ OTHER

No. of frames ____
____ B & W
____ Color
____ Audio
____ Carousel provided
____ Other packaging used
(Specify) ____

No. of frames ____
____ B & W
____ Color
____ Audio

____ Automatic synch
____ ____ Hz
____ Manual cue
____ Reel
____ Cassette
____ Cartridge

Specify:
____
____
____

12. Availability:

____ One copy free
For sale @ $ ____ per copy
____ Not available
X In ERIC system (No. ____)
____ Loan copy available

Contact: Name East Central Network Curr Coordination Phone (217) 786-6375
Illinois Vocational Curriculum Center
Address Sangamon State University Zip Code 62708
Springfield, IL

13. Copyright Restrictions:

NONE

Contact: Name ____ Phone ( ) ____

Address ____ Zip Code ____

14. What level(s) of assistance is required to provide implementation of this outcome?

____ awareness X understanding
____ deciding X implementing

15. Are Consultive/Inservice (or staff development) available? Yes ____ No ____

Contact: Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Research and Development Section, E-426
100 North First Street
Springfield, IL 62777
(217) 782-4620

16. General Description (State the general objective and suggested method of use. Summarize the content and tell how it is organized. Write the description so that it can be used to promote the material. Continue on back of this sheet or on another sheet, if necessary) Answer Below

17. Person Completing this Abstract: Richard W. Glogovsky

Full Address: Lake County Area Vocational Center
19525 W. Washington St.

Grayslke, IL

(312) 223-6681 Zip 60030

16. This learning guide will introduce the 11th or 12th grade student to the basic components of the Wang Office Information System 60. The material is competency-based and can be utilized as the introductory lesson in Word Processing on the Wang hardware.

LCAVC

LAKE
COUNTY
AREA
VOCATIONAL
CENTER

STUDENT LEARNING GUIDE

Produced By Jan Robinson

Date 5/17/84

TASK: Create and print a document on the OIS 60

PURPOSE: You will become familiar with the components of the Wang Office Information System 60 and the Wang Professional computer. Offices in Lake County use this word processing/information processing system more often than any other system for creating and editing documents.

Many office workers have terminals available to perform information processing activities. Knowing how to operate an information processing system will enable you to find employment more readily.

Program	Task	Est.Time	Prereq.
500	170.B	3 hours	148.B.1 148.B.2 148.B.11

LEARNING CONTRACT (optional)

1. STUDENT DATA

NAME ______________________ SOCIAL SECURITY NUMBER ______________________

LENGTH OF CONTRACT (NORMAL TIME IN HOURS) ______________________

2. TERMINAL PERFORMANCE OBJECTIVE

Given the needed supplies, equipment, and data, you will be able to create and print a document. You will be able to answer questions concerning the procedures followed to create and print this document with a minimum of 90 percent accuracy.

2a. INTERMEDIATE OBJECTIVE(s)

1. Create, edit, print, and file a short document
2. Select word processing activities from the Word Processing menu
3. Describe the keys that are not available on a typewriter
4. Describe the purpose of the cursor and how to move it
5. List the basic steps of word processing

3. AGREEMENT

I, ______________________ agree to complete the above stated terminal performance requirement within ____________ to ____________. I further recognize that the conditions of the contract (performance and time agreement) report my ability to perform the requirements of the occupation and record my progress.

Student's Signature ______________________

Instructor's Signature ______________________
(verifies competency)

INTERMEDIATE OBJECTIVE #1

Create, edit, print, and file a short document

LEARNING STEPS (Activities)	RESOURCES
1. To become familiar with the components of the word processing system you will be using, see Resource #1.	1. Read learning guide pages 3, 4, and 5. See instructor for demonstration.
2. To learn how to edit, print, and file a short document, see Resource #2.	2. Read pages 1-4 to 1-30 in GETTING ACQUAINTED - WANG WORD PROCESSING MANUAL. Complete all activities as directed.
3. Proceed to Intermediate Objective #2.	3. Learning guide - page 6.

OIS 60 AND WANG PC COMPONENTS

The OIS 60 is a modular system consisting of a master unit containing a fixed disk and diskette drives, workstations (CRT and keyboard), and printer(s). Wang Professional Computer components are very similar to those mentioned above. The PC consists of a workstation, and the electronics unit containing the disk drive.

MASTER AND ELECTRONIC UNIT

The master unit provides both removable (diskette) and fixed (hard disk) storage for your data, system software, and applications. The diskette drive stores approximately 140 typewriter pages (360,000 characters of data). The fixed disk drive stores approximately 10,000 typewritten pages.

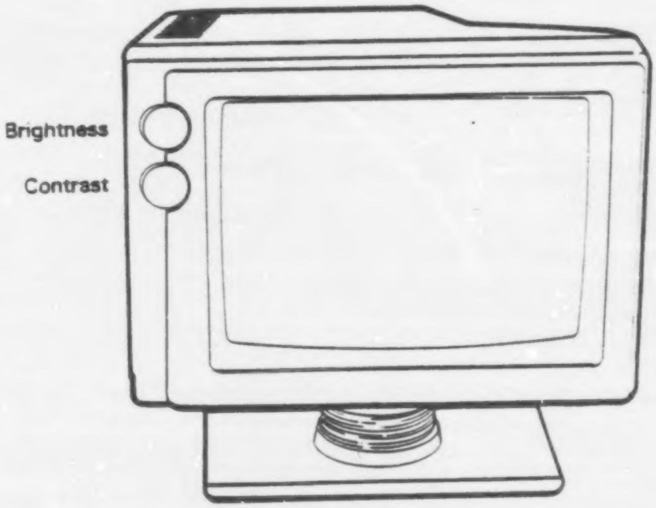
The electronic unit consist of the memory and a diskette for disk drive. Various software applications are available for the Wang PC.

WORKSTATION

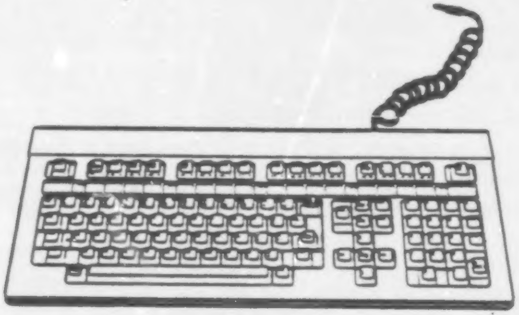
Each workstation consists of a monitor which displays information. This information can be the information you type at the keyboard or it can be system information.

Most monitors contain a Cathode Ray Tube (CRT) - a television-like vacuum tube with a luminescent screen. The Wang Monochrome Monitor displays green characters on a black background. The monitor has a brightness knob and a contrast knob that allow you to adjust the appearance of the screen display.

The monitor is on an adjustable pedestal base that lets you tilt the screen forward or backward and right or left.



You use the keyboard shown below to communicate with your computer system. You give instructions to the computer by typing in characters, numbers, text, or special keyboard commands. A coiled cable attaches the keyboard to the monitor. A separate 10-key keypad is located to the right of the standard typewriter keyboard. Cursor position keys and special keys allow you to perform such operations as insert, delete, and other useful information processing functions.

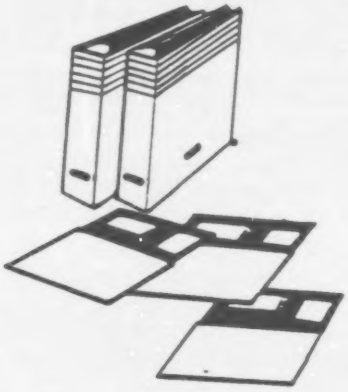


PRINTERS

Printers are available in a variety of types - character printers, laser printers, and dot matrix. Letter-quality character printers are available for your use here at the Vocational Center.

SOFTWARE

Office applications software available on the OIS 60 and their functions are listed on the chart that follows. As you work though these programs, you will begin to understand the functions of each.



STANDARD SOFTWARE

Features	Functions/Benefits
Wang Word Processing	Provides you with powerful text editing functions.
Advanced Functions	Allows text manipulation beyond simple word processing.
Glossary	Instantly retrieves and displays commonly used words, phrases, or standard paragraphs onto the screen. Saves time and keystrokes.
Decision Processing	Allows you great flexibility in creating Glossary documents for special applications. Any series of word processing commands can be automated and performed by the system by pressing two keys. Allows the OIS 60 to perform many additional special functions.
Sort	Performs all alphanumeric sort on records. Lists are quickly and easily sorted in ascending or descending order.
System Security	Protects documents with a password.
Mathematics Support Package	Allows you to perform common mathematical functions. No need to use an external calculator or computer.
Message Control	Allows you to send and receive messages between workstations. Other users can be notified of critical information, such as intent to power down the system.
System Utilities	Provides the ability to maintain, manage, and supervise system activities. System Utilities include the following: File Utilities, Volume Utilities, Supervisory Functions, and Control Functions.
Word Processing Utilities	Allows you to duplicate diskettes, recover damaged diskettes, and display an index listing of all libraries.

COMMUNICATIONS

WISE (Wang Inter-System Exchange) allows the OIS 60 to be cable connected to other OIS systems for the sharing of peripheral equipment and information. On our system it will be possible to access either printer and software applications resident on either of our two OIS systems.

SOURCE: WANG LABORATORIES, INC.

INTERMEDIATE OBJECTIVE #2

Select word processing activities from the Word Processing menu

LEARNING STEPS (Activities)

1. To learn how to select activities from menus, see Resource #1.
2. Proceed to Intermediate Objective #3.

RESOURCES

1. Read Selecting Activities from Menus in GETTING ACQUAINTED - WANG WORD PROCESSING MANUAL - pages 1 - 31 to 1 - 35. Complete activities as instructed.
2. Learning guide - page 7.

Program	Task	Page
500	170.B.1	6

INTERMEDIATE OBJECTIVE #3

Describe the keys that are not available on a typewriter

LEARNING STEPS (Activities)

1. To learn about the keyboard, see Resource #1.
2. Proceed to Intermediate Objective #4.

RESOURCES

1. Read pages 1 - 36 - 1 - 37. Complete all activities as instructed.
2. Learning guide - page 8.

INTERMEDIATE OBJECTIVE #4

Describe the purpose of the cursor and how to move it

LEARNING STEPS (Activities)

1. To learn about cursor movement, see Resource #1.
2. Proceed to Intermediate Objective #5.

RESOURCES

1. Read pages 1-40 - 1- 49 in GETTING ACQUAINTED. Complete all activities as directed.
2. Learning guide page 9.

INTERMEDIATE OBJECTIVE #5

List the basic steps of word processing

LEARNING STEPS (Activities)

1. To learn about the basic steps in word processing, see Resource #1.
2. To determine whether you have met the terminal performance objective, see Resource #2.

RESOURCES

1. Read pages 1-50 - 1-64 in GETTING ACQUAINTED. Complete all activities as directed.
2. See instructor for Post Test 173.B.1.

Turn in the following to your instructor:

1. Memo to the Manager
2. Far East Tours
3. AAA Travel Agency

PERFORMANCE/PRODUCT CHECKLIST

Program: SECRETARIAL OFFICE OCCUPATIONS - INFORMATION PROCESSING

Task No: 173.B.1

Student's Name: ____________________ Date Of Attempt: ____________

Evaluator's Name: ____________________ Evaluation Site: 133

Performance Attempt: 1 2 3 4

Terminal Performance Objective:

Given the needed supplies, equipment, and data, you will be able to create and print a document. You will be able to answer questions concerning the procedures followed to create and print this document with a minimum of 90 percent accuracy.

Directions To The Student:

Before attempting this task for mastery, carefully review this checklist. You will be evaluated on the basis of this checklist. When you feel you are ready for evaluation, contact your instructor. You must complete your performance within 40 minutes and must score at least ________ out of ________ points or ________ % for mastery. Critical items are marked with an asterisk (*). These items must be satisfactorily completed.

Directions To The Evaluator:

The student will contact you when ready for the evaluation. The student must complete the performance within 40 minutes and must score ________ out of ________ points or ________ % and all items marked with an asterisk (*) must be satisfactorily completed.

PERFORMANCE/PRODUCT CHECKLIST

NAME ______________________ DATE __________ SCORE _____

PROJECTS

MEMO TO MANAGERS __________

FAR EAST TOURS __________

AAA TRAVEL AGENCY __________

(Errors do not need to be corrected. Format must appear as illustrated in GETTING ACQUAINTED)

POST TEST

Parts I - III	Written Exam*	________	________	________
Part IV	Letter	________	________	________

- Block style
- Correct spacing (as illustrated)
- 60 space line

*90 percent accuracy

SECRETARIAL OFFICE OCCUPATIONS

CRITERION EXAM

TASK #170.B.1

The purpose of this exam is to determine whether or not you have understood the procedures for preparing and printing a document on a Wang Office Information System.

DIRECTIONS:

Write your answer(s) as directed on Parts I, II, and III of this test. A minimum score of 90 percent is required.

Keyboard the letter as directed in Part IV of this test. Form must follow standard block-letter style.

NAME ______________________ DATE ____________ GRADE ____________

POST TEST 1

PART I

DIRECTIONS: Circle T if the answer is True. Circle F if the answer is false.

T F 1. To move the cursor to the letter after CREATION LIBRARY, press RETURN. (Cursor must first be positioned at EDIT OLD DOCUMENT.)

T F 2. The LIBRARY NUMBER should be obtained from the person seated to your left.

T F 3. To position the ACCEPTANCE BLOCK next to CREATE NEW DOCUMENT, press the SOUTH CURSOR KEY.

T F 4. After positioning the acceptance block next to CREATE NEW DOCUMENT, the operator depresses the EXECUTE key.

T F 5. The system automatically assigns a document ID number. This number is unimportant; therefore, you do not need to write it down.

T F 6. It is important to enter your name the same way each time next to OPERATOR on the document summary.

T F 7. The comments line should be used to describe the contents of the document on the document summary.

T F 8. To store the document summary information in the CPU (central processing unit) and display a blank screen, depress CANCEL.

T F 9. The status line contains information related the the format of the document such as line spacing, tabs, and right margin.

T F 10. The message line contains the page number, line number, and position of the cursor.

T F 11. To move the cursor into the primary format line, depress SHIFT AND PRESS FORMAT.

T F 12. To set the format line for double spacing, type over the 1 with a 2.

T F 13. To clear the format line of all tabs and returns, depress the RETURN KEY.

T F 14. Position the cursor at the desired position on the format line and then press TAB to set a tab stop.

T F 15. The status line tells you where the cursor is positioned and should be watched when setting tabs and margins.

T F 16. To set the right margin on the format line, depress the RETURN key when your cursor is at the desired position.

T F 17. When you are satisfied with your format line, depress the EXECUTE key to lock in the setting and return you to the first line of text.

T F 18. Errors in keyboarding may be corrected by means of the INSERT and DELETE KEYS.

T F 19. To return to the word processing menu after completing a document, depress EXECUTE and then CANCEL.

T F 20. You must position the cursor next to SPECIAL PRINT FUNCTIONS when you are ready to print a document.

T F 21. To tell the system which document you wish to print, you must enter the DOCUMENT ID number unless it is already displayed.

T F 22. The Character Set No. that should be used with our system is 3.

T F 23. The printer number setting will vary depending upon which printer you choose to use.

T F 24. The EXECUTE KEY moves you from entry field to entry field in the Print Document menu.

T F 25. To tell the system that you plan to use a character printer, move the acceptance block next to Character.

T F 26. To tell the system that you plan to use a 12 pitch print wheel, move the acceptance block next to PS.

T F 27. To tell the system that you plan to use 8 1/2 x 11 sheets of paper, move the acceptance block next to Continuous.

T F 28. To begin printing, the POWER and SELECT switches must be illuminated.

PART II

DIRECTIONS: Match the function with the key that performs that function. Write the letter that comes before the correct answer on the blank provided.

______ 29. Moves the cursor to the format line

______ 30. Is the yes key

______ 31. Allows materials to be added to an already typed page

______ 32. Moves you to the next screen page

______ 33. Moves you to the previous screen page

______ 34. Creates a temporary indent for quoted material

______ 35. Used when the operator wishes to center a line horizontally

______ 36. Locates a designated word in the copy and moves the cursor to that word or words

______ 37. Moves the cursor backward

______ 38. Moves you to a specific page QUICKLY

______ 39. Moves cursor toward the right

______ 40. Moves cursor toward the left

______ 41. Moves cursor toward the top of the screen

______ 42. Moves the cursor toward the bottom of the screen

______ 43. Returns you to the word processing menu

______ 44. Keys that determine the appearance of text on the screen

______ 45. Keys that position the cursor in a document

______ 46. Keys that change text

______ 47. Keys that tell the system to complete or not complete an operation

a. Cancel and execute
b. Shift + format
c. East cursor key
d. West cursor key
e. North cursor key
f. South cursor key
g. Center
h. Srch
i. Indent
j. Goto
k. Backspace
l. Prev
m. Next
n. Execute
o. Insert
p. Locate

(Continued on next page)

q. Format
r. Transaction
s. Edit

PART III

DIRECTIONS: Write the correct answer on the blank provided.

48. The system reads text back into its memory through the ________________ head.

49. The system intelligence, which includes memory, is made up of __________ components.

50. When you are no longer working on a document, you can store it on an ________________ diskette.

51. The four basic steps in word processing are ___________, ___________, ________________, and ___________.

PART IV

DIRECTIONS: Set format line for 60 spaces; no tabs will be needed. Type the letter that follows in block style. It is not necessary to correct typographical errors. Print out a hardcopy of this letter.

(Current Date)

Mr. Robert Wise
142 East Green St.
Danville, IL 61832

Dear Mr. Wise

It has been some time since you and I have had an opportunity to visit, but I still remember with considerable pleasure your last visit to Champaign.

This summer we are scheduling an eight-week conference devoted to the improvement of business-letter writing. I should like to take part in that conference during one of the following days: June 20, July 28, or August 2.

Nothing would please me more than to be able to advertise the fact that you will be one of the consultants at the conference.

Please write me the good news that you can be with us.

Sincerely

John Helbig

xx

SOURCE UNKNOWN

Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Research and Development Section

Product Abstract

1. Title of material: Machine Shop Task List
2. Date material was completed: June 1, 1984
3. Please check one: [✓ New material] Revised material Field-tested material
4. Originating agency: Lake County Area Vocational Center
   Address: 19525 W. Washington St. Grayslake, IL Zip Code 60030
5. Name(s) of developer(s): Richard Glogovsky, Will Pouler and Jerry Digilio
   Address: 315 N. Fox Run Road
   Libertyville, IL Zip Code 60048
6. Developed pursuant to Contract Number: R-99-14-X-0313-499

7. Subject Matter (Check only one according to Department of Education Code):

Code

01 Agricultural Education
03 Business and Office Education
04 Distributive Education
07 Health Occupations Education
09 Home Economics Education
10 Industrial Arts Education
[✓ 16 Technical Education]
[✓ 17 Trade and Industrial Education]
22 Cooperative Education
Career Education
Other (Specify)

8. Education Level:

Pre-K Thru 6
[✓ Post-Secondary]
Administrator (Pre-Service)
7-8
[✓ Adult]
9-10
Teacher (Pre-service)
Other (Specify)
[✓ 11-12]

9. Intended for Use By:

[✓ Student]
Teacher Educator
Other (Specify)
[✓ Classroom Teacher]
Guidance Staff
[✓ Local Administrator]
State Personnel

10. Student Type:

[✓ Regular]
Limited-English Proficiency
Disadvantaged
Handicapped
Other (Specify)

11. Medium and Format of Materials:

[✓ HARDCOPY]
No. of pages 6
Paper bound
Hard bound
Loose-leaf
Photos: Yes No
Diagrams: Yes No

VIDEOTAPE
Minutes
B & W
Color
inches

FILM
Minutes
B & W
Color
mm

MICROFICHE
B & W
Color

200

11/5.

N-A

___ SLIDES

No of frames ______
- ___ B & W
- ___ Color
- ___ Audio
- ___ Carousel provided
- ___ Other packaging used

(Specify) __________

___ FILM STRIPS

No of frames ______
- ___ B & W
- ___ Color
- ___ Audio

___ AUDIO

- ___ Automatic synch
- ___ ______ Hz
- ___ Manual cue
- ___ Reel
- ___ Cassette
- ___ Cartridge

___ OTHER

Specify: __________

---

12. Availability:

___ One copy free

For sale @ $ _____ per copy

___ Not available

X In ERIC system (No. __________)

___ Loan copy available

Contact: Name East Central Network for Curr Coordination Phone (217) 786-6375

Illinois Vocational Curriculum Center

Address Sangamon State University, Springfield IL Zip Code 62708

13. Copyright Restrictions:

Contact: Name None Phone ( ) ______

Address __________ Zip Code ______

14. What level(s) of assistance is required to provide implementation of this outcome?

X awareness X understanding

X deciding ______ implementing

15. Are Consultive/Inservice (or staff development) available? Yes _____ No _____

Contact:

Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Research and Development Section, E-426
100 North First Street
Springfield, IL 62777
(217) 782-4620

16. General Description (State the general objective and suggested method of use. Summarize the content and tell how it is organized. Write the description so that it can be used to promote the material. Continue on back of this sheet or on another sheet, if necessary.) Answer Below

17. Person Completing this Abstract: Richard W. Glogovsky

Full Address:

Lake County Vocational Center
19525 W. Washington St.
Grayslake, IL Zip 60030

16. The Competency/Task List for Vocational Machine Shop has been developed to assist instructors in updating their machine shop programs with the latest technology. The Competency/Task List began with the identification of basic skills/knowledge and progressed to a more advanced level of performance with the integration of new technology.

MACHINE SHOP TASK LIST

001 Demonstrate an understanding of Machine Shop Rules and Regulations

002 Demonstrate knowledge of Learning Delivery System

003 Demonstrate knowledge of general and machine tool safety rules and procedures

004 Demonstrate an understanding of measurement systems and their related tools

A. Inch
B. Metric
C. Linear
D. Angular

005 Use mathematics in practical applications as applied to machine shop operations

A. Algebra and formulas
B. Practical geometry
C. Right triangle - trigonometry

006 Demonstrate an understanding of the metal machinery theory

A. Metallurgy
B. Metal cutting
C. Cutting feeds and speeds

007 Perform various layout operations

A. Layout tools
B. Interpreting machine prints
C. Semi-precision layout
D. Precision layout

008 Demonstrate an understanding of an engine lathe

A. Lathe parts and functions
B. Lathe safety
C. Set-up tools
    1. Holding tools
    2. Cutting tools
    3. Accessory tools
D. Set-up procedures
E. Speeds and feeds
F. Coolants

009 Operate an engine lathe

A. Grind lathe cutting tools
B. Tracing
C. Turning
D. Drilling and reaming
E. Threading
F. Boring
G. Knurling
H. Tape turning
I. Grinding
J. Polishing
K. Turn project to specs

010 Demonstrate an understanding of drill press operation

A. Drill press parts and functions
B. Drill press safety
C. Set-up tools
    1. Holding tools
    2. Cutting tools
    3. Accessory tools
D. Set-up procedures
E. Speeds and feeds

011 Operate drill press

A. Grind twist drills
B. Drilling
C. Countersinking
D. Counterboring
E. Tapping
F. Reaming
G. Hole cutting
H. Spot facing
I. Drill project to specs

012 Demonstrate an understanding of pedestal grinder

A. Grinds parts and function
B. Grinds safety
C. Grinding wheel characteristics
D. Set-up procedure

013 Operate a pedestal grinder

A. Wheel dressing
B. Offhand grinding
C. Grinding project to specs

014 Demonstrate an understanding of surface grinder

- A. Surface grinds parts and functions
- B. Surface grinds safety
- C. Holding device
  - 1. Magnetic chuck
  - 2. Vise
  - 3. Angle plates
  - 4. V-blocks
  - 5. Indexing head
- D. Grinding wheel characteristics
- E. Set-up procedures

015 Operate a surface grinder

- A. Wheel dressing and trueing
- B. Grinding parallel surface
- C. Squaring up a block
- D. Grinding a shoulder
- E. Grinding a radius
- F. Angular grinding
- G. Grind project to specs

016 Demonstrate an understanding of metal cutting machine band saw

- A. Vertical and horizontal cutting
- B. Band saw parts and functions
- C. Band saw safety
- D. Band saw holding procedures and devices
  - 1. Manual - push stick
  - 2. Vise
- E. Band saw blade characteristics
- F. Set-up procedures
- G. Speeds and feeds
- H. Coolants

017 Operate a metal cutting band saw

- A. Straight and circular cut
- B. Blade welding
- C. Cuts metal to specs

018 Demonstrate an understanding of horizontal milling

- A. Horizontal mill parts and functions
- B. Horizontal mill safety
- C. Set up tools
  - 1. Holding tools
  - 2. Cutting tools
  - 3. Accessory tools
- D. Set-up procedures
- E. Speeds and feeds
- F. Coolants

019 Operate a horizontal mill

A. Tool cutter mounting
B. Milling cutting procedures
    1. Plain milling
    2. Slat milling
    3. Gang milling
    4. Side milling
    5. Fore/end milling
    6. Gear cutting
C. Machine project to specs

020 Demonstrate an understanding of vertical milling

A. Vertical mill parts and functions
B. Vertical mill safety
C. Set-up tools
    1. Holding tools
    2. Cutting tools
    3. Accessory tools
D. Set-up procedure
E. Speeds and feeds
F. Coolants

021 Operate a vertical mill

A. Indicate mill head
B. Milling cutting procedures
    1. End milling
    2. Milling a block square
    3. Fly cutting
    4. Finding an edge
    5. Precision location drilling, reaming and tapping, etc.
    6. Precision dimension milling and boring
    7. Radius milling - rotary table
    8. Index milling - index head
    9. Square head milling
    10. Angular milling
C. Machine project to specs

022 Demonstrate an understanding of advanced metallurgy

A. Physical structure
B. Properties of metals
C. Heat treatment of metals

023 Demonstrate an understanding of advanced measurement

A. Comparison and surface measurement
B. Force measurement

024 Demonstrate an understanding of metal processes

A. Manufacturing methods
B. Steel fabrication
C. Aluminum fabrication
D. Brass and soft metal fabrication

025 Demonstrate an understanding of plastic machining

A. Lathe
B. Mill
C. Drill

026 Demonstrate an understanding of specialty grinding

A. Internal grinding
B. Cylindrical grinding
C. Cutting tool grinding

027 Perform specialty grinding

A. Tool selection
B. Machine set-up
C. Observe safety rules
D. Grind to specs

028 Demonstrate an understanding of an electrical discharge machine (EDM)

A. Identification of EDM parts
B. EDM safety
C. Electrode selection and design

029 Operate an EDM

A. Select or design electrode
B. Set-up procedure
C. Working speed
D. Cut tp specs

030 Identify the development steps of numerical control machining

A. History of numerical control
B. Advantages and disadvantages of numerical control
C. How a numerical control system operates
D. Cartesian coordinate system
E. Absolute and incremental dimensioning
F. Machine axis relationships
G. Point to point N.C. control
H. Continuous path N.C. control

031 Identify N.C. and C.N.C. imput media

- A. Tape specifications and coding
- B. Basic functions controlled by N.C.
    - 1. Sequence numbers
    - 2. X, Y and Z words
    - 3. Decimal formats
    - 4. Zero depressions
    - 5. Preparatory codes-G
    - 6. Feed rates
    - 7. Spindle speeds
    - 8. Miscellaneous codes-M
- C. N.C. and C.N.C. program examples
    - 1. Block formats
    - 2. Rapid Moves
- D. Other functions controlled by N.C. and C.N.C.
    - 1. Linear interpolation-G01
    - 2. Circular interpolation-G02 and G03
    - 3. Programmable Z depth
    - 4. Tool length compensation
    - 5. Work plane
    - 6. Program manuscripts

032 Writing N.C. and C.N.C. programs

- A. Drawing analysis
    - 1. Machine tool
    - 2. Process steps
    - 3. Tooling
    - 4. Feeds and speeds
- B. Point to point programming
    - 1. Sequences, positioning, cutting depths, functions
    - 2. Feeds and speeds
    - 3. Punch tape
    - 4. Dry run program
- C. Drill and tap N.C. program exercise

033 Operate a CNC vertical mill

- A. Start up
- B. Set work coordinate system (X0, Y0)
- C. Load program by tape
- D. Set tool length offsets at machine
- E. Dry run program
- F. Machine part to specifications

034 Operate CNC lathe

- A. Start up
- B. Set work coordinate system (X0, Z0)
- C. Load program by tape
- D. Set tool offsets
- E. Dry run
- F. Machine-part to specifications

035 Demonstrate an understanding of advanced production machines

A. Automated machines
B. Turrent machines

Illinois State Board of Education

Department of Adult, Vocational and Technical Education
Research and Development Section

Product Abstract Machine Shop Student Learning Guides on Numerical Control and Computer Numerical Control

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2. Date material was completed May 9, 1984

3. Please check one: New material X Revised material ___ Field-tested material ___

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16. General Description (State the general objective and suggested method of use. Summarize the content and tell how it is organized. Write the description so that it can be used to promote the material. Continue on back of this sheet or on another sheet, if necessary.)

Answer Below

17. Person Completing this Abstract: Richard Glogovsky

Full Address:

Lake County Area Vocational Center
19525 W. Washington St.
Grayslake, IL Zip 60030

16. These two learning guides will introduce the 11th and 12th grade student to the basic concepts of Numerical Control (NC) and Computer Numerical Control (CNC). The material is competency-based and can be utilized for the introduction to the use of new technology equipment in the high school machine shop.

LCAVC

LAKE
COUNTY
AREA
VOCATIONAL
CENTER

COMPETENCY-BASED INDIVIDUALIZED VOCATIONAL EDUCATION INSTRUCTION

STUDENT LEARNING GUIDE

Produced By W. Pouler Date May 9, 1984

TASK: Identify the Development Steps of Numerical Control Machining

PURPOSE: This guide will explain the history, advantages and disadvantages, and how NC systems operate. Cartesian coordinates, absolute and incremental dimensioning, and machine axis relationships will also be explained. The difference between point to point machining and continuous path machining will be illustrated. The mastery of this knowledge will simplify the numerical control programming that will be performed in later sessions.

Machine Shop

Program	Task	Est.Time	Prereq.
48.0503	030	8.0 hrs	004&005

jlk

LEARNING CONTRACT (optional)

1. STUDENT DATA

NAME

SOCIAL SECURITY NUMBER

8.0 Hours
LENGTH OF CONTRACT (NORMAL TIME IN HOURS)

2. TERMINAL PERFORMANCE OBJECTIVE

Given:	The necessary information and a written exam.
You will:	Identify the development steps of numerical control machining.
How well:	To master this task you most score 36 out of 42 correctly, 85% on the exam.

2a. INTERMEDIATE OBJECTIVE(s)

1. Identify the history of numerical control.
2. Identify the advantages and disadvantages of numerical control.
3. Identify how a numerical control system operates.
4. Identify cartesian coordinate systems.
5. Use absolute and incremental dimensioning.
6. Identify machine axis relationship.
7. Illustrate NC point to point control.
8. Illustrate NC continuous path control (contouring).
9. Identify the development steps of numerical control machining.

3. AGREEMENT

I, ______________________ agree to complete the above stated terminal performance requirement within ____________ to ____________. I further recognize that the conditions of the contract (performance and time agreement) report my ability to perform the requirements of the occupation and record my progress.

Student's Signature

Instructor's Signature
(verifies competency)

INTERMEDIATE OBJECTIVE #1

1. Identify the history of numerical control.

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #1 to learn about numerical control history.	1. Information sheet #1, page 4, in learning guide.
2. Complete review exercise #1 listed in resource #2 to check your understanding of NC history.	2. Review exercise #1, page 5 in this learning guide.
3. Use resource #3 to check your answers for review exercise #1.	3. Answer sheet, page 48, in this learning guide.
4. Re-read information sheet #1 and correct any wrong answers on review exercise #1.	4. Information sheet #1, page 4, in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #2, page 6, in this learning guide.

INFORMATION SHEET #1

History of Numerical Control

A form of numerical control has existed since blueprints or sketches were dimensioned. These dimensions (numbers) were used by the craftsman (machinist) to manually control the movements of the machine tools. As design of machine tools changed, it allowed more machine controls to be operated automatically. Only then did automation within the manufacturing industries become a reality.

Automation is a term that comes from the automatic, which means self-acting or self-adjusting. Characteristics of automated machines or systems usually include the following:

1. They operate independently or without human help.
2. They automatically detect variations from the planned operation.
3. They automatically adjust machine or system controls to maintain planned operations.

In 1948, John T. Parson, working on a U.S. Air Force grant to Massachusetts Institute of Technology, is usually given credit for the idea of numerical control. However, as far back as 1725, Knitting machines in England were controlled by punched cards. Cloth designs were woven according to a set of pre-punched cards that directed machine operations.

The player piano, developed by M. Founeaux in 1863, use the principal of air passing through holes in a roll of paper to actuate the piano keys. Music boxes, using pre-positioned pins on a revolving drum, and other similar devises for automatic control were developed about the same time.

The introduction of mass production in the late 19th. century probably had the greatest impact upon the development of numerical control. The American System of interchangeable parts manufacture allowed manufacturing industries to mass produce single components of an assembly by repeating a machine cycle many times.

During the early 1900's, many new developments in electrical, hydraulic and pneumatic equipment allowed additional automation in the machine tool industry. Automatic screw machines, once they were set-up, could rapidly produce parts with a minimum of human assistance.

T. Parson's N.C. research efforts resulted in a successful demonstration in 1952 of a three axis milling machine with numerical control. America's industries soon began to use N.C. machine tools to produce precision parts. Recent surveys of machine tool builders indicate that approximately 90% of all new machine tools purchased are equipped with N.C. capabilities.

REVIEW EXERCISE #1

History of Numerical Control

(Fill in or check the proper word for the blank spaces)

A. Characteristics of automated machines or systems are:

B. The ______________ on blueprints or plans are used by craftsmen to manually control the movements of machine tools.

C. Mr. ________________ is usually given credit for the idea of numerical control.

D. The player piano uses the principal of air passing through ________________ in a roll of paper to actuate the piano keys.

E. The introduction of __________________ probably had the greatest impact on the development of numerical control.

F. The first successful demonstration of a three axis numerical control system was on a __________________ machine.

G. Approximately ______% of all machine tools now built have N.C. capabilities.

H. The early knitting machines in England were controlled by ________________.

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________

7.
- ☐ Automobile
- ☐ Mass Production
- ☐ Lathe
- ☐ Metal Cutting Tools

8.
- ☐ Lathe
- ☐ Grinder
- ☐ Milling Machine
- ☐ Shaper,

9.
- ☐ 25%
- ☐ 40%
- ☐ 75%
- ☐ 90%

10.
- ☐ Electric Motors
- ☐ Wind Mills
- ☐ Punched Cards
- ☐ Hydraulic Cylinders

INTERMEDIATE OBJECTIVE #2

2. Identify the advantages and disadvantages of numerical control.

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #2 to learn about advantages and disadvantages of NC.	1. Information sheet #2, page 7, in this learning guide.
2. Complete review exercise #2 listed in resource #2 to check your understanding of advantages and disadvantages of numerical control.	2. Review exercise #2, page 8, in this learning guide.
3. Use resource #3 to check your answer in review exercise #2.	3. Answer sheet, page 48 in this learning guide.
4. Re-read information sheet #2 and correct any wrong answers on review exercise #2.	4. Information sheet #2, page 7, in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #3, page 9, in this learning guide.

INFORMATION SHEET #2

Advantages and Disadvantages of Numerical

Advantages

It takes just as long to perform a machine operations with NC equipment as it would with similar (non NC) equipment. Then, how can there be advantagesin using numerical control equipment? Using NC machining, direct labor saving can be achieved by:

1. Operator safety is improved by reducing the amount of time the operator is exposed to the machine's moving parts.
2. Converting idle machine time to metal cutting time.
3. Reduce number of setups. Performing many different operations with the same machine setup. Also reduces material handling.
4. Reducing the number of inspections between operations.
5. Increases operator efficiency. With less operatormachine time required, the operator can take care of several machines.
6. Reduces scrap due to human error. Parts are machined at optimum speeds and feeds.

Using NC machining, indirect saving can be achieved by:

1. Reduced parts inventory. The use of stored tape programs allows quick scheduling of machining operations, therefore fewer extra parts need to be stored.
2. Reduced lead time. Lead time is the time needed to plan, prepare tools, machining of jigs and fixtures and other operations prior to actually machining the parts. Much of this eliminated in numerical control machining operations.
3. Fewer machines required. NC machines can duplicate operations of many other machines, therefore fewer machines can do more machining operations.
4. Reduce tool and machine damage. Since NC machining operations are programmed at recommended speeds and feeds, both tools and machines last longer.
5. NC is ideal for small quanitiy orders. Since less tooling and lead time is required, it is more economical to produce small orders.
6. Less machining skill required to operate NC machines.

Disadvantages

The disadvantages of NC machining can be grouped into three basic area:

1. Higher initial cost of the NC machines.
2. Higher skilled maintenance workers required to keep NC machines in good running condition.
3. Need for retraining of present machine operators.

Review Exercise #2

Advantages and Disadvantages of Numerical Control

No review exercise for this unit. They are included in review exercise #3.

INTERMEDIATE OBJECTIVE #3

3. Identify how a numerical control system operates.

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #3 to learn about how a numerical control system operates.	1. Information sheet #3, page 10, in this learning guide.
2. Complete review exericse #3 listed in resource #2 to check your understanding of numerical control systems.	2. Review exercise #3, page 13, in this learning guide.
3. Use resource #3 to check your answers in review exercise #3.	3. Answer sheet, page 48 in this learning guide.
4. Re-read the information sheet #3 and correct any wrong answers on review exercise #3.	4. Information sheet #3, page 10 + 11 in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objectice #4, page 14, in this learning guide.

INFORMATION SHEET #3

IDENTIFY HOW A NUMERICAL CONTROL SYSTEM OPERATES

Numerical control, or NC, was another development by man aimed at making work easier. NC is really an efficient method of reading blueprints and conveying this information to machine controls. These controls regulate speeds, feeds, and various other motions of the machine tool.

In the conventional machining operation, the machinist starts off with the part blueprint. This blueprint gives all the necessary dimensions about the part. This information is used by the machinist to manually control the machine tool and produce the part.

In a numerical control operation, the dimenstions from the blueprint is transformed to coded punched holes on a tape or card. This same coded information can also be recorded on a magnetic tape or stored in the memory of a computerized numerical control (CNC) machine. This coded information will automatically operate all of the machine controls. The operator merely has to secure the part in the machine's holding fixture and start the NC or CNC machining operatio, fig. 030-1.

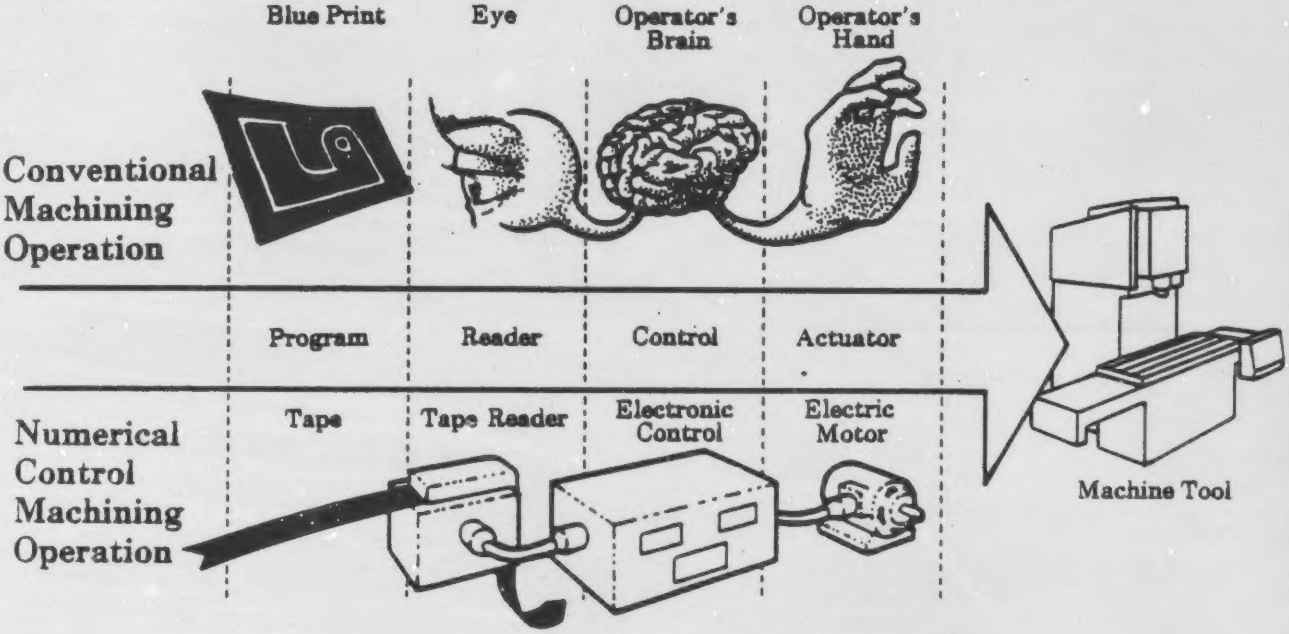
Blue Print
Eye
Operator's Brain
Operator's Hand
Conventional Machining Operation
Program
Reader
Control
Actuator
Tape
Tape Reader
Electronic Control
Electric Motor
Numerical Control Machining Operation
Machine Tool

Fig. 030-1 Converntional and NC Machining

A NC system has the following basic components:

1. A control unit that interprets the coded instructions and adjusts the machine controls to perform the required operations, fig. 030-2.
2. A punched tape, card or magnetic tape that is coded to relate to the part print and supplies the electrical pulses to the control unit, fig 030-3.

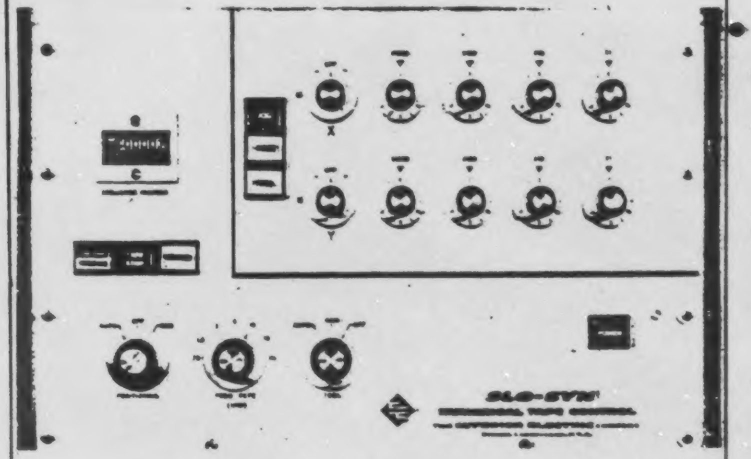

Fig. 030-2 NC Control Unit
(Superior Electric)

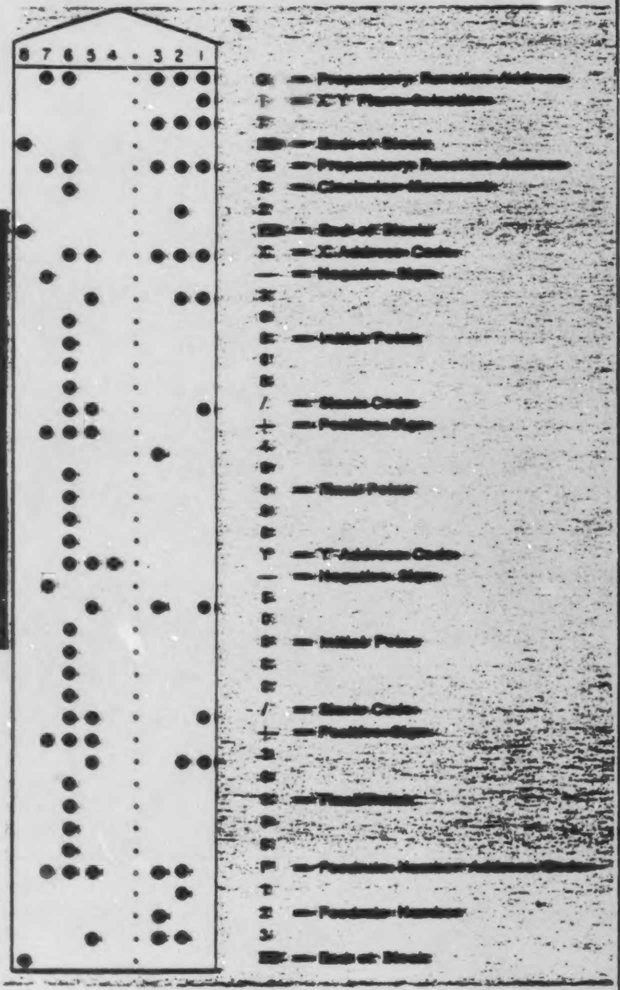

Fig 030-3 Punched Tape

3. The machine drive motors that directs the regulated controls of the machine components, fig. 030-4.
4. An electrical or electronic feedback device that tells the control unit how much the machine has moved. A system with feedback is usually called a closed loop system, fig. 030-4.

The control unit or electronic controller is the heart of the NC system. It reads the programmed punched tape, converts this information to electrical signals that controls machine movements. The feedback signals compares the actural machine movements to the required programmed movements.

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INFORMATION SHEET #3 (continued)

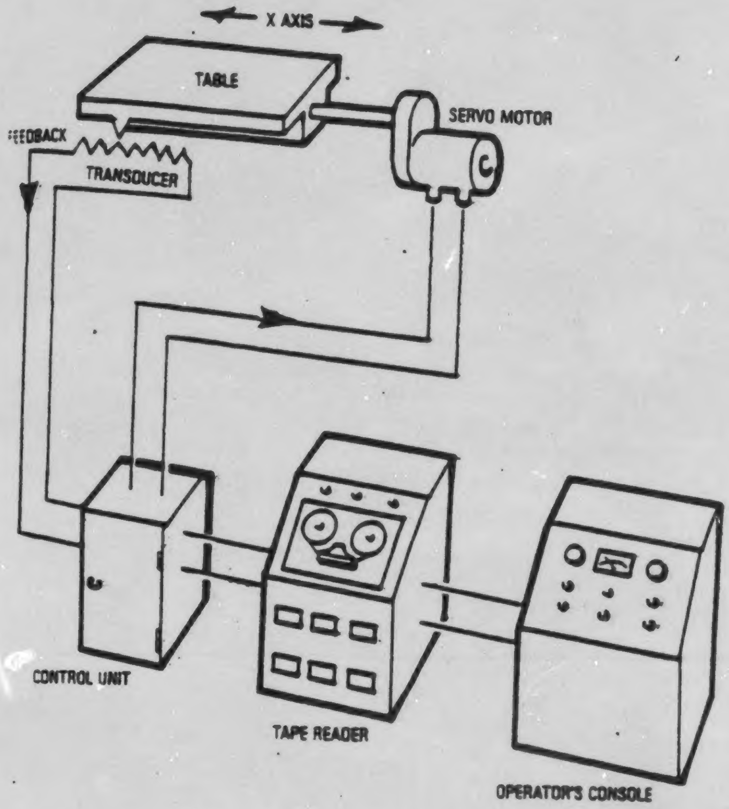

X AXIS
TABLE
SERVO MOTOR
FEEDBACK
TRANSDUCER
CONTROL UNIT
TAPE READER
OPERATOR'S CONSOLE

Fig. 030-4 Machine Drive and Feedback

Review Exercise #3

How a Numerical Control System Operates

(Fill in the word or check the proper answer.)

1. The time required for planning and tooling up to produce a part is called:

1.
- ☐ Down time
- ☐ NC Efficiency
- ☐ Lead time
- ☐ Material handling time

2. One of the disadvantages of NC machining is:

2.
- ☐ Not good for small orders
- ☐ Increses tool breakage
- ☐ Increased scrap
- ☐ Higher machine cost

3. Machining time on a NC machines is _________ than on a non-NC machine.

3.
- ☐ Less
- ☐ Equal
- ☐ Greater

The following statements are true or false.

	True	False
4. A part blueprint is not needed for NC machine.	____	____
5. An NC moachine operator needs more training than a machinist.	____	____
6. An NC machine operator needs more training than a machinist.	____	____
7. NC systems will completely eliminate machine operators.	____	____
8. The NC punched tape is a coded duplication of dimensions on the part print.	____	____
9. Feedback is absolutely necessary in a NC machining system.	____	____
10. CNC machining systems do not need a coded punch tape.	____	____

INTERMEDIATE OBJECTIVE #4

4. Identify Cartesian coordinate systems.

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #4 to learn about Cartesian coordinate systems.	1. Information sheet #4, page 15 and 16 in this learning guide.
2. Complete review exercise #4 listed in resource #2 to check your understanding of Cartesian coordinate systems.	2. Review exercise #4, page 17 and 18 t is learning guide.
3. Use resource #3 to check your answers in review exercise #4.	3. Answer sheet page 48 in this learning guide.
4. Re-read the information sheet #4 and correct any wrong answers on the review exercise #4.	4. Information sheet #4, page 15 and 16 in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #5 page 21 in this learning guide.

INFORMATION SHEET #4

CARTESIAN COORDINATE SYSTEMS

The Cartesian coordinate system is the basic system of measurement used for all numerical control machines. It is the basic numbering system that relates to the X,Y, and Z axis or movement of the table and cutting tool of a numerical control machine.

X COORDINATES

An equally divided line with each division numbered is called a numbered line. If this line is horizontal as viewed from the fron view of an orthographic projection, it is concerned with the X axis. The starting point, labeled 0, can be located anywhere on this line.

Numbers to the rignt of the starting point are labeled +(plus. Numbers to the left of the starting point are labeled - (minus). In figure 030-5, the A point has an X value of -3 and the B point has an X value of +2. Point C is the origin.

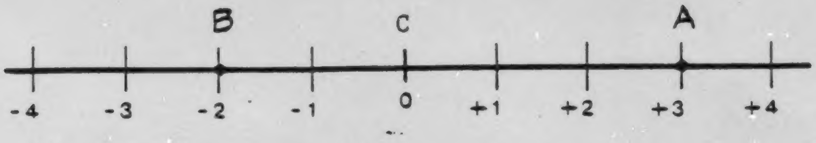


Fig. 030-5, X coordinates

Y COORDINATES

A vertical line as viewed from the top view of an orthographic projection, would be concerned with the Y axis. Numbers above the 0 starting point would be labeled + and numbers below the 0 starting point would be labeled -. In figure 030-6, the A point below would have a Y value of +2 and the B point would have a Y value of -4.

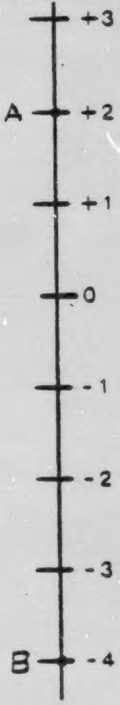


Fig.030-6, Y coordinates

Z COORDINATES

The third axis is positioned perpendicular to the X and Y axis, figure 030-7. The Z value of numbers avove the origin would be + and Z values below the origin would be -.

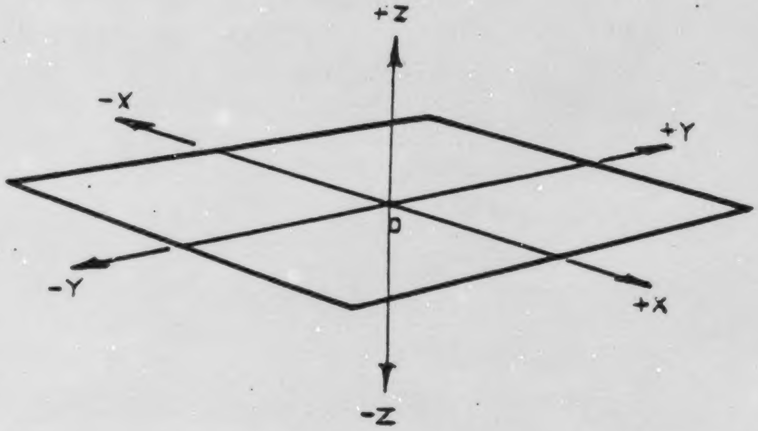


Fig. 030-7, Z coordinates

QUADRANTS

When the X and Y axis lines intersect perpendicularly at the 0 point, they form a graph called a cartesian grid. These two lines form four segments which are called quadrants. These quadrants are numbered I, II, III, IV, figure 030-8.

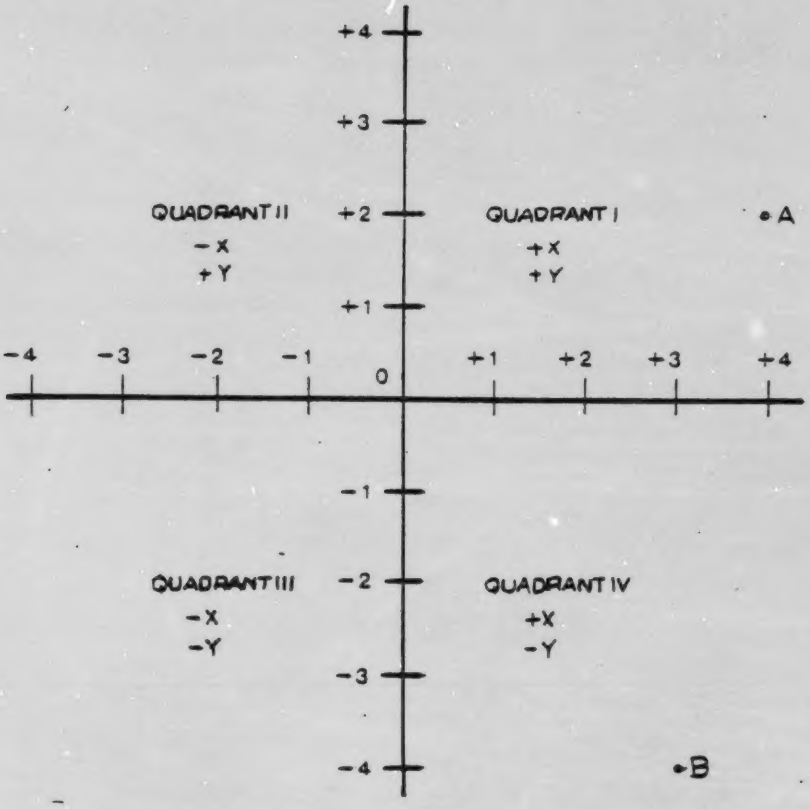


Fig. 030-8 Cartesian Grid

The X and Y values of any point are determined by the point's position from the 0 starting point.

In quadrant I, both X and Y values would be +.

In quadrant II, X values are - and Y values would be +.

In quadrant III, both X and Y values are -.

In quadrant IV, X values are + and Y values are -.

The coordinates for point A would have values of X=+4 and Y=+2. The coordinates for poin B would have values of X=+3 and Y=-3.

The starting point 0 (origin) is very important because it must be considered in programming a numerical control machine. More on this matter will be comvered later in the NC programming section.

Review Exercise #4

Cartesian Coordinate Systems

(Fill in the word or check the correct answer)

1. The basic system of measurement used in numerical control is

1.
☐ The origin
☐ The plane
☐ The cartesian coordinate system
☐ The graph

2. Whether a point on the X axis is + or - is determined by

2.
☐ Fixed assisgned value
☐ Points position from origin
☐ Cartesian calculation
☐ NC machine axis

3. Which of the following symbols indicate on which side of the origin a coordinate is located?

3.
☐ = +
☐ > <
☐ + -
☐ < ∟

4. The Z axis is positioned __________ to the X and Y axis.

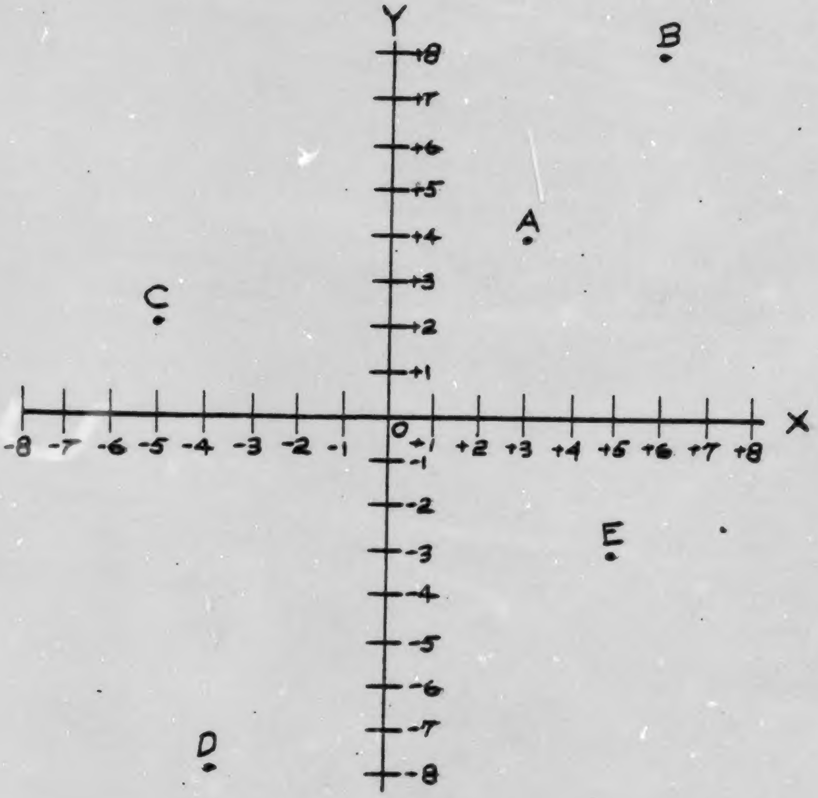
4. ____________________

5. The value of both X and Y coordinates are + in the __________ quadrant.

5. ____________________

6. through 10.

Indicate the X and Y coordinates for points A through E in the figure below.


Y
X
+8
+7
+6
+5
+4
+3
+2
+1
0
-1
-2
-3
-4
-5
-6
-7
-8
-8 -7 -6 -5 -4 -3 -2 -1 +1 +2 +3 +4 +5 +6 +7 +8
A
B
C
D
E

6. Point A

X=______ Y______

7. Point B

X=______ Y______

8. Point C

X=______ Y=_____

9. Point D

X=______ Y=_____

10. Point E

X=______ Y=_____

INTERMEDIATE OBJECTIVE #5

5. Use absolute and incremental dimensioning.

LEARNING STEPS (Activities)	RESOURCES
1. Read rsourse #5 to learn about absolute and incremental dimensioning.	1. Information sheet #5, page in this learning guide.
2. Complete review exercise #5 to check your understanding of absolute and incremental dimensioning.	2. Review exercise #5, page15-16in this learning guide.
3. Self check review exercise #5.	3. Answer sheet, page 48 in this learning guide.
4. Re-read the information sheet #5 and correct any wrong answers on review exercise #5.	4. Information sheet #5 page in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #6 page 24 in this learning guide.

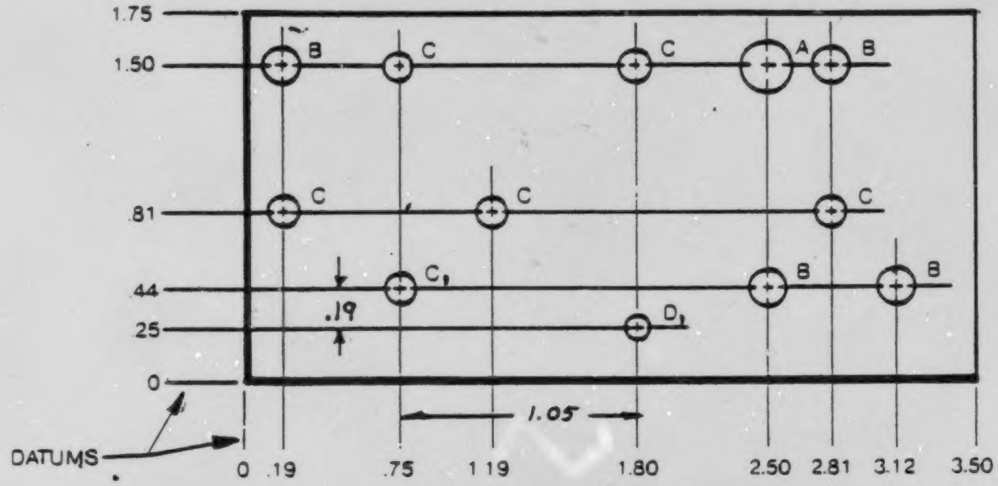
INFORMATION SHEET #5

ABSOLUTE AND INCREMENTAL DIMENSIONING

As mentioned, dimensions on a part print are used to determine X, Y and Z coordinates in NC machining. Many industries have simplified their part prints, particularly if the part is machined on a NC machine. Two dimensioning systems are frequently used for NC applications, ordinate dimensioning and tabular dimesioning.

ORDINATE DIMENSIONING

The datum lines are indicated as zero coordinates Dimensions are shown at the end of extension lines and no arrowheads are shown, fig. 030-9. All dimensions originate from the intersection of the horizontal and left vertical base lines. The dimensions locate the part features, holes in this case. Hole diameters, are indicated in a seperate table located somewhere on the print.



SIZE SYMBOL	A	B	C	D
HOLE DIAMETER	.350	.188	.156	.125

Fig. 030-9, Ordinate Dimensioning.

TABULAR DIMENSIONING

Tabular dimensioning is similar to the ordinate system, expect both feature locations and sizes are located in a separate table. If the features have depth dimensions, such as holes passing only part way through the object, this will be indicated by a Z coordinate on the table, fig. 030-10.

ABSOLUTE DIMENSIONS

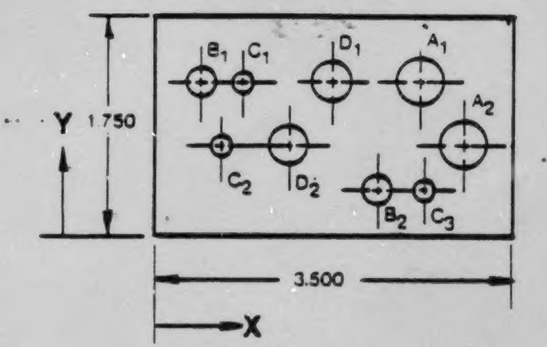
Both the ordinate and tabular dimensioning systems are considered absolute dimensioning. They both originate their dimensions from a fixed point (X=0 and Y=0). NC machines that have memory capabilities (remembers the starting point, using a computer) are considered absolute positioning machines. All commands entered into the machine are described from the origin, called the zero point or starting point. This can be a fixed point on the machine or a fixed point on the part, once it is clamped on the machine table.

INCREMENTAL DIMENSIONING

NC machines which are not capable of remembering where the origin is located, after making a movement, are considered as having incremental positioning.

We can use figure 030-9 to illustrate incremental positioning. Assume that the NC machine has moved to position D_1 (X=+1.80 and Y=+.25). After drilling this hole, you want to drill C_1 hole. This NC machine cannot remember the origin(X=0 and Y=0), which was the starting point. The NC machine will now consider the present position, D_1, as a new starting position with X=0 and Y=0. To move to point C_1, the machine must move to the left (minus direction for X coordinate). The new coordinates to move from D_1 to C_1 would be: X=-1.05 and Y=+.19.

Most newer numerical control machines (those with computer controls) have the capability to remember the original starting point. These machines are called CNC machines.



	REQD	2	2	3	2
	HOLE DIA.	.250	.190	.150	.200
POSITION		HOLE SYMBOL			
X →	Y ↑	A	B	C	D
3.000	1.500	A_1			
3.250	.780	A_2			
.500	1.500		B_1		
2.750	.500		B_2		
.780	1.500			C_1	
.680	.780			C_2	
3.100	.500			C_3	
2.250	1.500				D_1
1.500	.780				D_2

Fig. 030-10, Tabular Dimensioning

REVIEW EXERCISE #5

Absolute And Incremental Dimensioning

(Fill in the word or check the correct answer)

1. The _________ on a part print are used to determine X, Y and Z coordinates.

1. ______________________

2. On ordinate dimensioning prints the dimension _______________ are not shown.

2. ______________________

3. _______________ dimensions are not shown along the part drawing of a tabular dimensioned print.

3. ______________________

4. NC machines which are not capable of remembering where the origin or zero point is located are refered to having?

4. ☐ Poor memory
   ☐ Absolute positioning
   ☐ Two axis positioning
   ☐ Incremental positioning

5. Movement from the origin in quadrant II requires?

5. ☐ + commands for X & Y
   ☐ - commands for X & Y
   ☐ - Commands for X & + commands for Y
   ☐ + commands for X & - commands for Y

6. The newer NC machines that have the capability to remember the starting point are called ___________ machines.

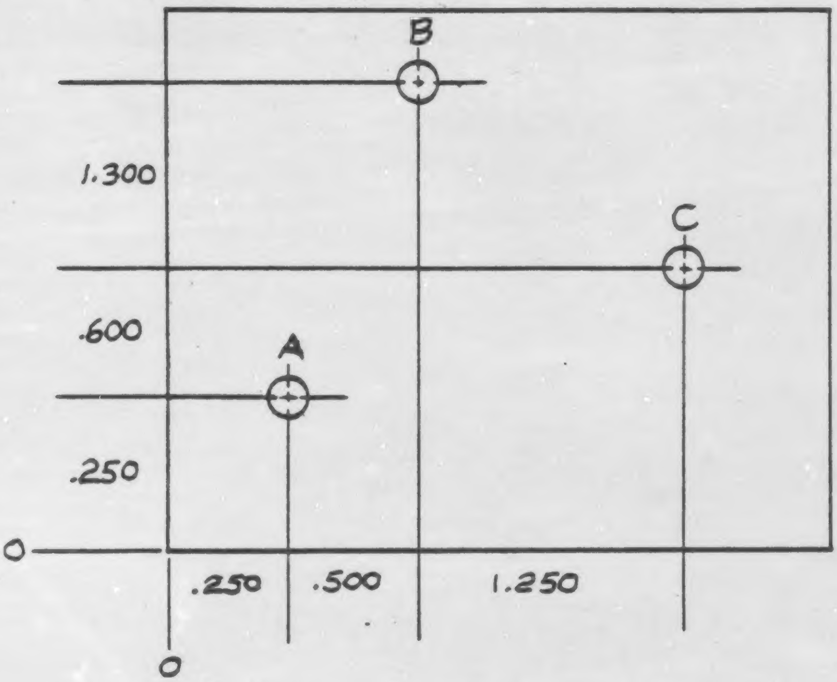
6. ______________________

7. On ordinate and tabular dimensioned part prints, the lower ___________ corner of part drawing is considered the origin.

7. ______________________

Review Exercise #5 (continued)

Figure for questions 8, 9, 10.



8. What are the values for the X and Y coordinates for point "C" using an absolute positioning machine?

8. X=__________

Y=__________

9. What are the values for the X and Y coordianates for point "B" (after point "A") using an incremental positioning machine?

9. X=__________

Y=__________

10. What are the values for the X and Y coordinates for point "C" (after point "B") using an incremental positioning machine?

10. X=__________

Y=__________

INTERMEDIATE OBJECTIVE #6

6. Identify machine axis relationship.

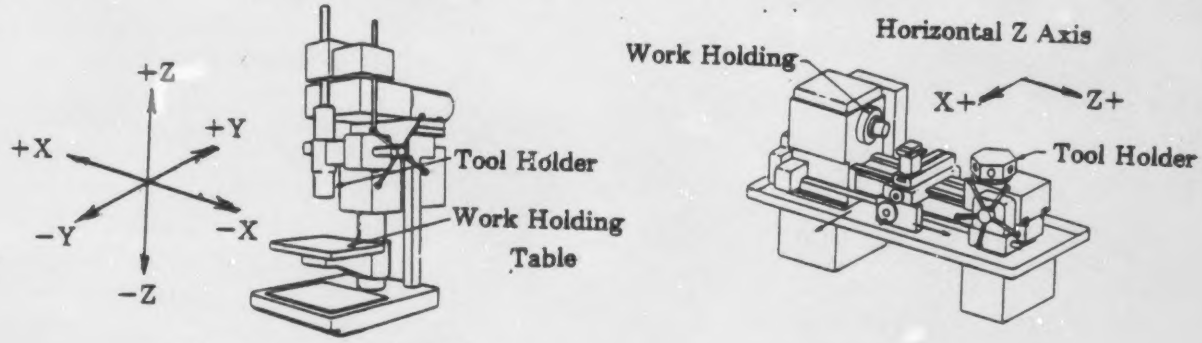
LEARNING STEPS (Activities)	RESOURCES
1. Read resource #6 to learn about machine axis relationship.	1. Information sheet #6, page 25-26 in this learning guide.
2. Complete review exercise #6.	2. Review exercise #6, page 27-28 in this learning guide.
3. Self check review exercise #6.	3. Answer sheet, page 49 in this learning guide.
4. Re-read the information sheet #6 and correct any wrong answers on review exercise #6.	4. Information sheet #6, page 25-26 in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #7, page 29 in this learning guide.

INFORMATION SHEET #6

MACHINE AXIS RELATIONSHIP

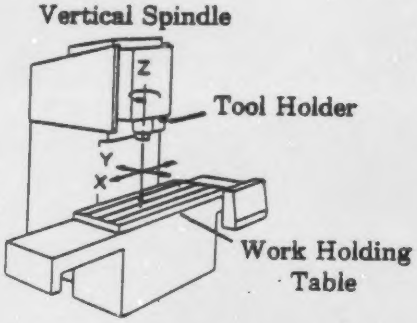
All of the basic machining operations can be adopted to numerical control. The main difference when using the various types of NC machines is the assignment of the X, Y and Z axis.

The base rule is to assign the Z axis to the machine spindle. If the machine has no spindle, then the Z axis is perpendicular to the working surface. On milling, boring and drilling machines, the spindle is the rotating tool. On lathes, the spindle is the rotating work, fig. 030-11.


+Z
+Y
+X
-Y
-X
-Z
Tool Holder
Work Holding
Table
Horizontal Z Axis
Work Holding
X+
Z+
Tool Holder

Single Spindle Drilling Machine

Turret Lathe


Vertical Spindle
Z
Tool Holder
Y
X
Work Holding
Table

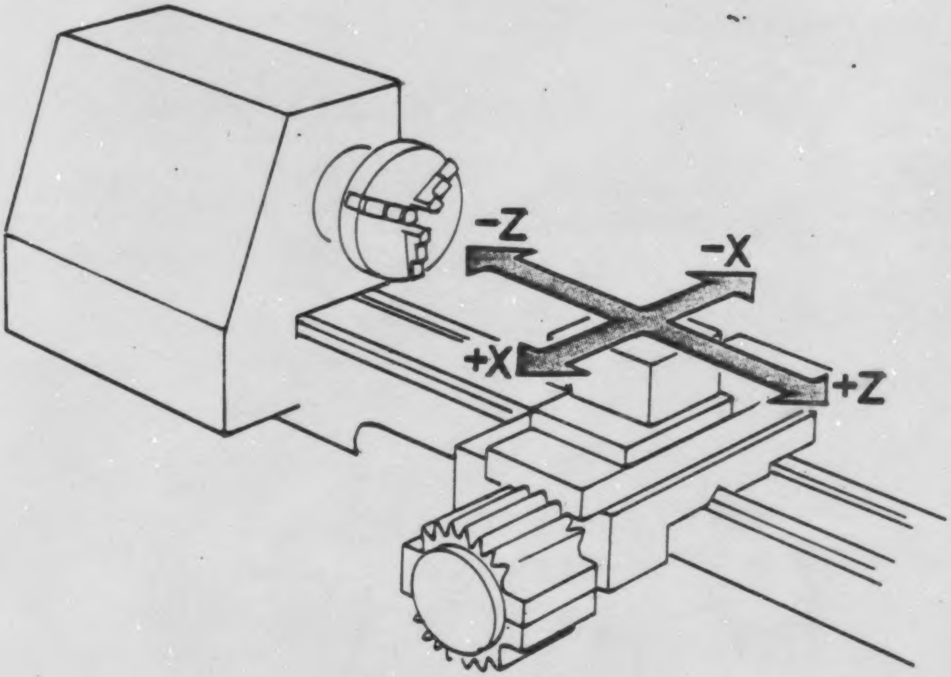
Milling Machine, Three Axis

Fig. 030-11 Machine Axis

In most NC machining operations, the X axis is horizontal (right to left), Y axis is also horizontal (front to back) and Z axis is vertical (up and down). The Y axis is rarly used on a NC lathe, since it relates to the height of curring tool. A rule to remember is that the X axis is always horizontal and parallel to the work holking surface.

More sophisticated CNC machines may have several axis. Both linear (straight) motion and rotary motion is involved in advanced NC machine tools. Additional axis information (lathe) is illustrated in figure 030-12.

Coordinate system on lathes



Z-axis = Axis parallel to the turning axis

X-axis = Axis rectangular to the turning axis

-Z movement = movement of longitudinal slide in direction of headstock

+Z movement = movement of longitudinal slide away from headstock

-X movement = see drawing

+X movement = see drawing

Fig. 030-12, Lathe Axis

REVIEW EXERCISE #6

Machine Axis Relationship

(Fill in the word or check the correct answer)

1. Which axis is used the least amount on an NC lathe?

1. ☐ X
☐ Y
☐ Z
☐ None of the above.

2. Which part of a lathe is designated as the X axis?

2. ☐ Cross slide on the carriage
☐ Carriage along the bed
☐ Tool cutter up or down
☐ The head stock

3. The __________ axis is always parallel to the machine spindle.

3. ____________________

4. In most NC operation the vertical milling machine is in a __________ direction.

4. ____________________

5. The Z axis on a NC vertical milling machine is in a ____________ direction.

5. ____________________

6. The Z axis of a drill press or mill is?

6. ☐ Parallel to XY plane
☐ Adjoins the XY plane
☐ Is perpendicular to XY plane
☐ Signifies rotary NC control

REVIEW EXERCISE #6 (continued)

7. On a NC lathe, using a ________________ coordinate, moves the cutting tool in toward the lathe bed. — 7. ________________

8. On a drill press, the depth of cut would be indicated as the _________ coordinate. — 8. ________________

9. Besides the lathe, another NC machine having a horizontal Z axis would be the __________. — 9. ________________

10. Changing height of cutting tool on a NC lathe is along the __________ axis. — 10. ________________

INTERMEDIATE OBJECTIVE #7

7. Illustrate NC point to point control.

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #7 to learn about NC point to point control.	1. Information sheet #7, page 30-32 in this learning guide.
2. Complete review exercise #7.	2. Review exercise #7, page 33 in this learning guide.
3. Self check review exercise #7.	3. Answer sheet, page 49 in this learning guide.
4. Re-read the infofmation sheet #7 and correct any wrong answers on review exercise #7.	4. Information sheet #7, page 30-32 in this learning guide.
5. Go to next intermediate objective.	5. Intermediate Objective #8 page 34 in this guide.

INFORMATION SHEET #7

POINT TO POINT NC CONTROL.

There are two forms of numerical control:

1. Point to point
2. Continous path or contouring.

POINT TO POINT

The point to point system is used primarily to position the part or tool. This system is suitable for machining holes, countersinking, reaming, tapping or similar operations. The coordinate position of each hole is programmed and the machine will move the tool or part to the programmed position. After the hole is drilled, the drill is retracted to clear the workpiece and moved to the next programmed position. The following illustration will further clarify NC point to point control.

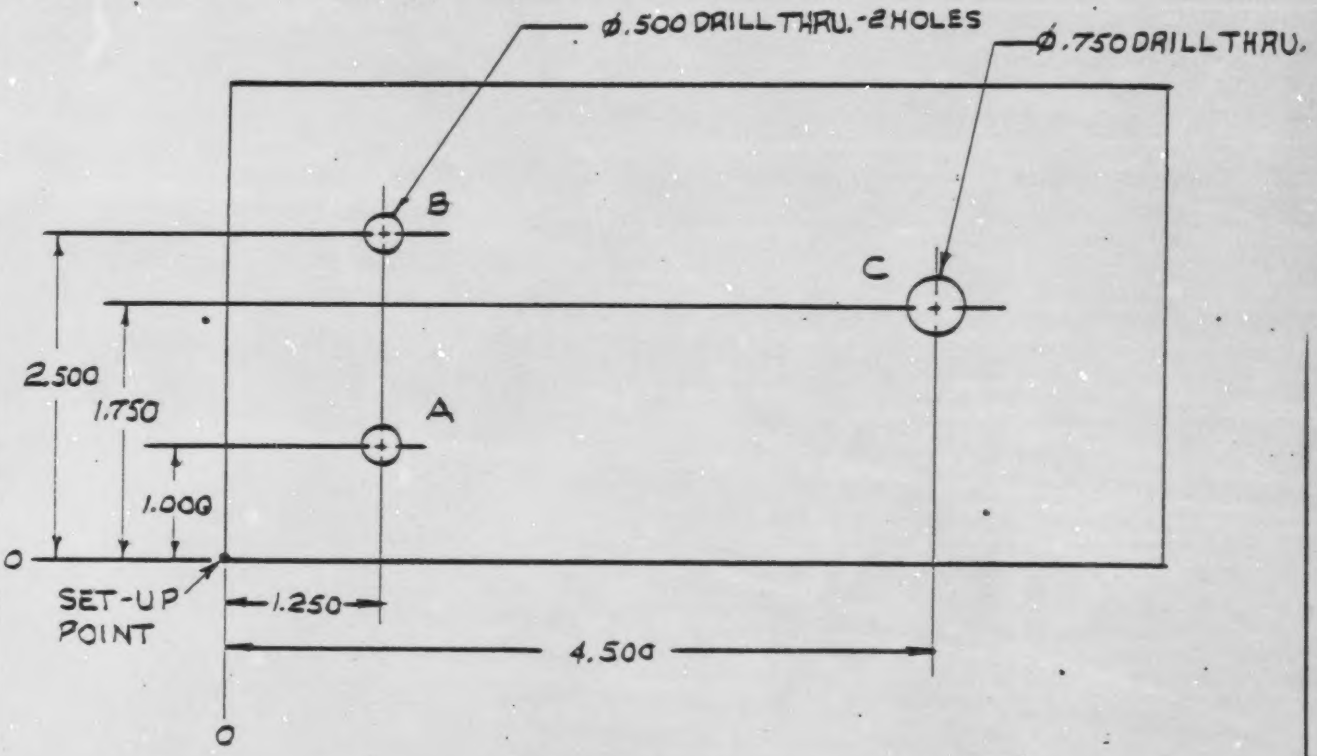


Fig. 030-13, Machining on a NC Drill Press (horizontal controlled table and vertically controlled spindle)

The numerical control program will use the set-up as the starting point (X=0 and Y=0). The first NC machine operation will be to drill hole A. The table will move in a plus X direction 1.250 inches and a plus Y direction 1.000 inches. The drill spindle is now aligned with the center of hole A. The second NC machine operation wil be to turn on the drill spindle and move it down in a Z direction until the drill passes through the workpiece. The drill is now extracted and the spindle turned off.

The next step is to move the table until the hole B is aligned with the drill spindle. Hole B is now drilled. The last NC machining operation is to drill hole C. Hole C is larger in diameter than hole A or B, therefore a tool cahnge will be required for drilling hole C.

Hole C could be drilled before hole B, but that procedure would require an extra tool change. The drilling sequence of hole A, hole C and hole B would require two tool changes rather than one tool for sequence A, B and C.

The direction of tool movement in a point to point system is not critical. The too movement from point B to point C could be curved path or a straight line, fig. 030-14.

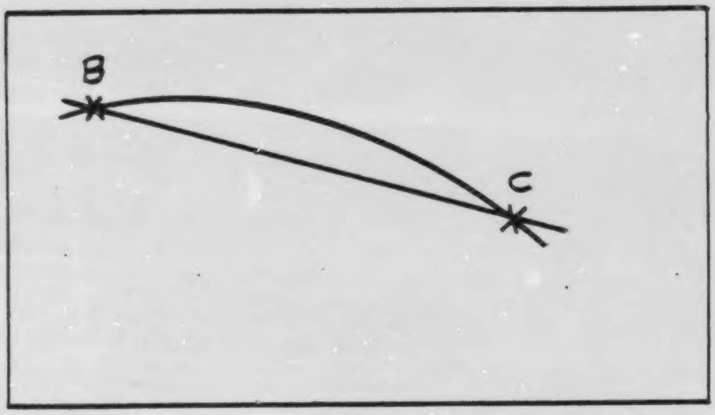


Fig. 030-14 Tool path movement

Most point to point NC controlled machines also permit straightline cutting, such as milling of slots or grooves. These are usually along the X or Y axis. A 45° angle slot can also be milled by having both of the X and Y drive motors moving at the same time, figure 030-15.

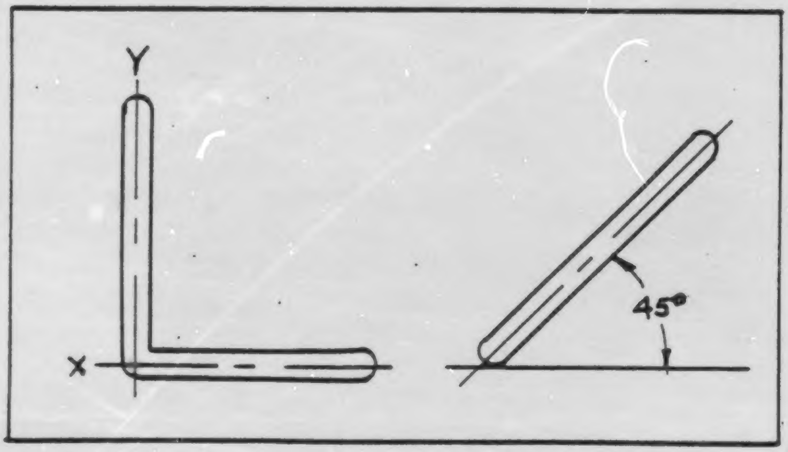


Fig. 030-15 Milling X, Y and 45° slots.

INFORMATION SHEET #7 (continued)

When milling slots, the cutting tool spindle is started and advanced in the Z axis (depth of cut) before the table is moved in the X or Y direction. When milling a 45° slot, the same procedure is followed except the X and Y axis drive motors operate at the same time.

REVIEW EXERCISE #7

NC Point to Point Control

No review exercise for this unit-- included in review exercise #8.

INTERMEDIATE OBJECTIVE #8

8. Illustrate NC continuous path control (contouring).

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #8 to learn about NC continuous path control.	1. Information sheet #8, page 35-37 in this learning guide.
2. Complete review exercise #8.	2. Review exercise #8, page 38-39 in this learning guide.
3. Self check review exercise #8.	3. Answer sheet, page 49 in this learning guide.
4. Re-read the information sheet #8 and correct any wrong answers on review exercise #8.	4. Information sheet #8, page 35-37 in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #9, page 40 in this learning guide.

NC CONTINUOUS PATH CONTROL (CONTOURING)

Continuous path numerical control machines are capable of moving the tool or workpiece at any angle or along any path. In continuous path machining, the cutting tool is in continuous contact with the workpiece. The tool is cutting as the machine follows a programmed path and the workpiece is moving.

In effect, the X and Y movements completed by a continuous path NC machine are along small point to point increments, figure 030-16. A point to point NC machine could perform contour milling, but the junction of each segment must be plotted on the X and Y axis. Each line segment may be only .0002 in length. To machine a curve one inch in lenth would require 5000 separate X and Y coordiante entrees into the NC program.

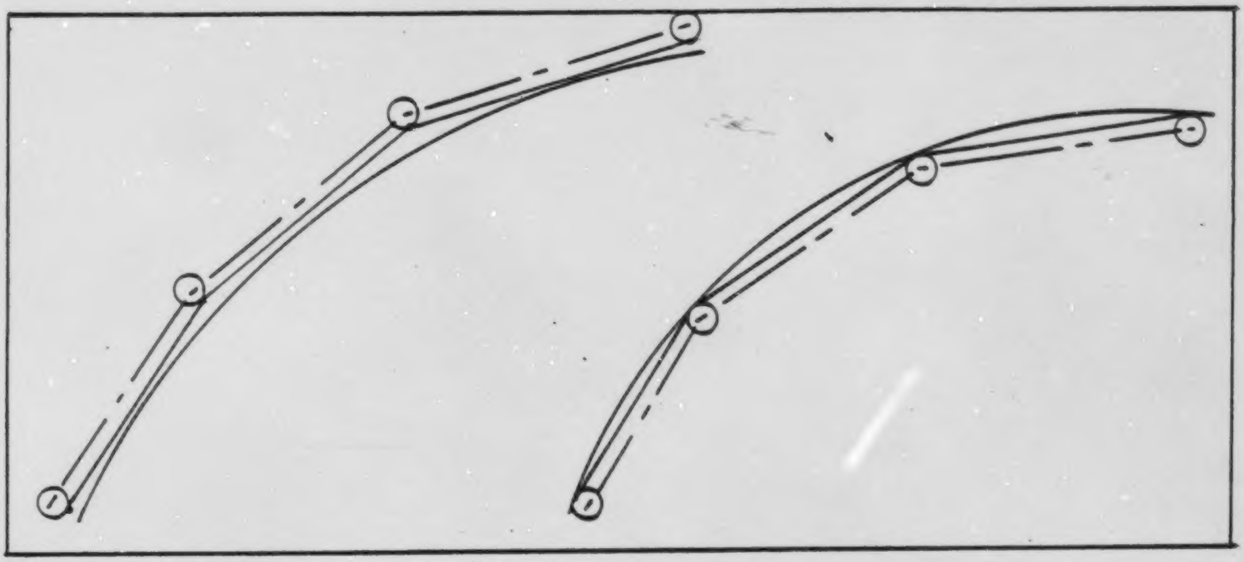


Fig. 030-16, Continuous Path Tool Movements (enlarged for clarity)

For this same reason, a computer is mandatory for NC continuous path control. NC machines capable of continuous path machining are now called computerized numerical control machines. (CNC).

As already mentioned, point to point NC machines have limited capability to perform continuous path operations. These operations, usually restricted to the NC milling machines, are generally limited to metal cuts parrel to the X or Y axis. Milling operations of this type are sometimes called picture fram milling operations. In these situations, the cutting tool usually remains at a constant depth.

COMPARING POINT TO POINT AND CONTOUR NC CONTROL

With a regular NC machine (without a computer) the tool movement from A to B in figure 030-17 would be:

1. With both X and Y position motors operating at the same time, the tool would move at a 45° angle to the intermediate point I.

2. With only the X position motor operating, the tool would move to position B. The tool has now moved (in two steps) to position B.

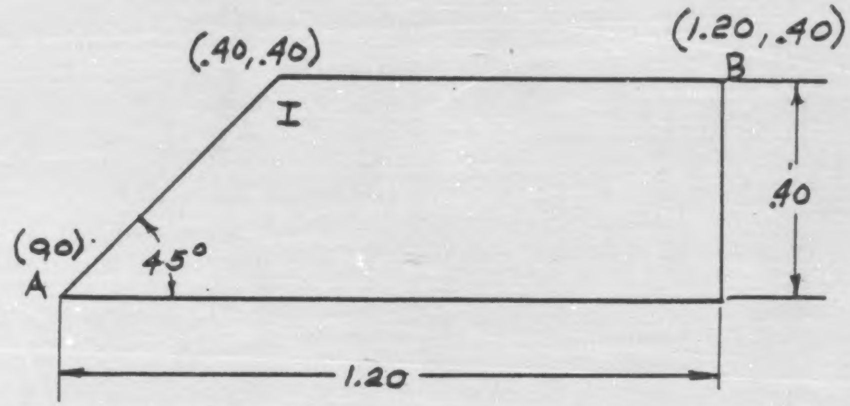


Fig. 030-17, Point to Point Positioning

With a computerized NC machine, the tool movement would move directily from point A to point B, figure 030-18. The computer will accept a coded number (G01) which directs the built in programming of the computer to perform the mathematics required to move the tool in the X and Y directions to arrive at point B. This is called interpolation and is illustrated by the small step by step X and Y movements.

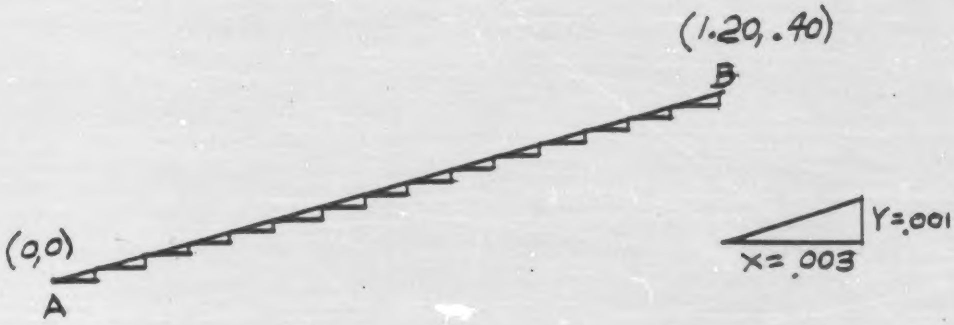


Fig. 030-18, Contour NC Positioning

As an example, if each small tool movement was .003 in the X direction and .001 in the Y direction, it would take 400 step movements for the tool to move from position A to position B along the straight line path as illustrated in figure 030-18. It is now easy to understand the benefit of a computer in NC machine control.

The above illustration was for a straight line (linear) control. Contour control relates to cutting along a curve or circular movements. Any curve has a radius and the amount of the radius determines the shape of the curve. The computer is also programmed to accept a contour control code (G02 in this case) and will move the tool in a circular path.

INFORMATION SHEET #8 (continued)

The important information needed forco ntour machining is:
1. Location of the center of the radius.
2. The amount of the radius.
3. The start and finish points of the radius.

The two basic contour NC machine controls are illustrated in figure 030-19.

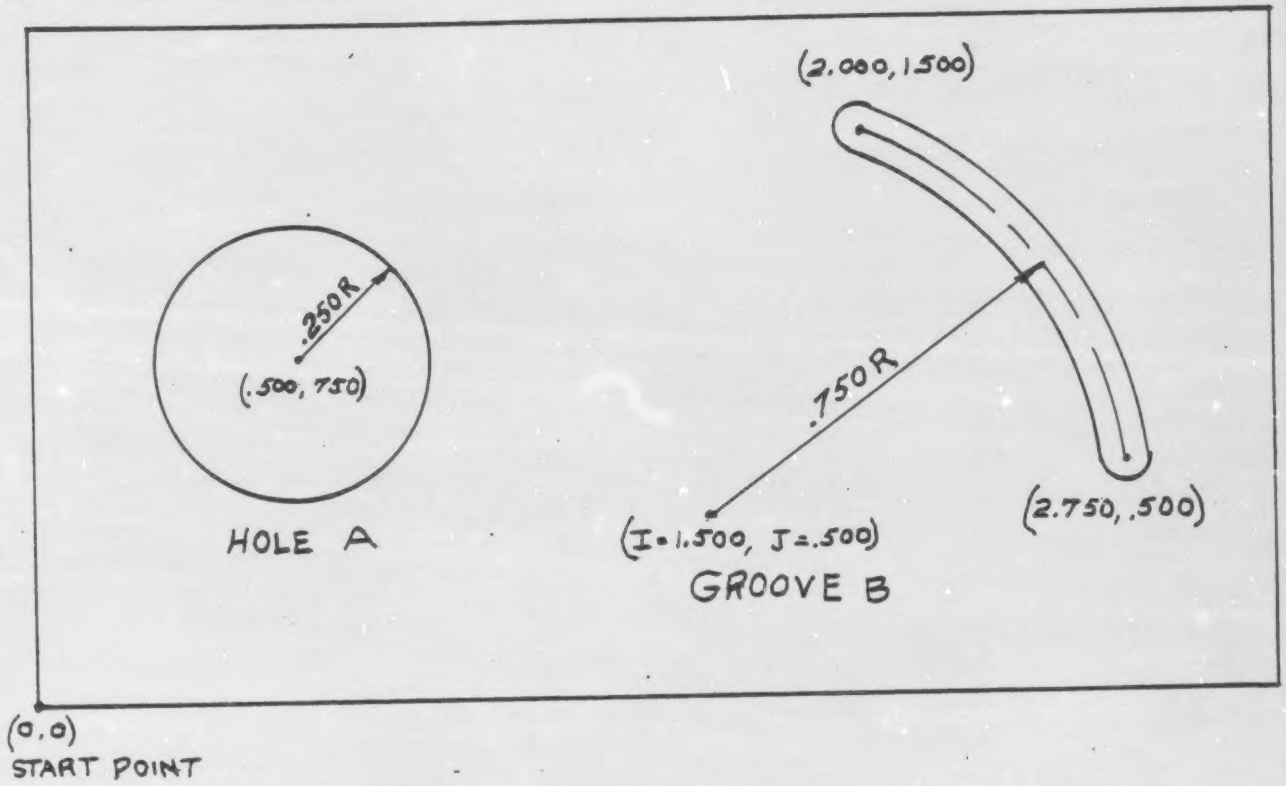


Fig. 030-19, NC Contour Controls

In machining of the hole A, the location of the hole center (.500, .750) and the radius (.250) is the movement information needed for NC programming for that hole. For machining the circular groove B, the start point (2.000, 1.500), the radius (.750) and the radius center location (I=1.500, J=.500), and the groove finish point (2.750, .500) is needed for the NC programming of this groove. The width of the groove is determined by the cutting tool diameter.

So far we have only discussed controlling the X and Y axis movements. A three axis contouring NC machine, in addition to controlling the X and Y axis, may also be cutting at different depths. The third axis which provides depth control of the cut is the Z axis. A 3 dimensional NC machine can control machining along all three axis at all times during the machine cycle. More information on threee axis contour control will be presented in the next section, NC programming.

REVIEW EXERCISE #8

NC Point to Point and Continuous Path Control

(Fill in the word or check the correct answer)

1. Point to point control simply means that the cutting tool:

1. ☐ Is in contact with the work surface when being moved from one point to the next
   ☐ Is only capable of moves parallel to the axis
   ☐ Can be moved in only one axis at a time
   ☐ Is not in contact with the work surface when being moved from one point to the next

2. Point to point positioning NC machines are used most frequently in.

2. ☐ Milling operations
   ☐ Flame cutting operations
   ☐ Drafting operations
   ☐ Drilling and related operations.

3. An NC machine with point to point control may be capable of:

3. ☐ Linear interpolation
   ☐ Picture frame milling
   ☐ Point to point positioning
   ☐ All of the above

REVIEW EXERCISE #8 (continued)

4. Which of the following choices describes a feature of contouring or continuous path NC machines?

4. ___ Circular movement
___ Encoded Work table
___ Actuator cups
___ Quadrant selection

5. Which axis control the depth of cut on a contouring NC milling machine?

5. ___ X Axis
___ Y Axis
___ Z Axis
___ J Axis

6. The main difference between a plain NC and a NC machine capable of contour machining is the addistion of a ____________________.

6. ______________________________

7. Boring of a hole on a NC milling machine requires the location of the holes center and the ____________ of the hole.

7. ______________________________

8. 9. 10.

Machining of an arc on a NC machine requires location of the arc's ____________________, ________________ and ____________________.

8. ______________________________

9. ______________________________

10. ______________________________

INTERMEDIATE OBJECTIVE #9

9. Identify the development steps in numerical control machining.

LEARNING STEPS (Activities)	RESOURCES
1. Review the resources #1 through #8.	1. Information sheets #1 through #9 in this learning guide.
2. Check over review exercise Identified in Resource #2.	2. Review exercises #1 through #9 in this learning guide.
3. Schecule a time with instructor to take final examination on Task 030. (Available time = one hour).	3. Instructor has the final task examinations.
4. Submit completed final examination to Instructor.	4. Instructor
5. Go to next assigned task.	5. Instructor will issue learning guide for task #031.

PROGRAM Machine Shop

CRITERION EXAM

TASK # 030

DIRECTIONS:

THE PURPOSE OF THIS EXAM IS TO DETERMINE WHETHER OR NOT YOU HAVE UNDERSTOOD THE INFORMATION ON Identifying the development steps of numerical control machining.

Each of the questions or incomplete statements below is followed by several words, phrases, or a series of numbers. Choose the one which best answers the question or completes the statement correctly. Place the letter associated with that choice (A, B, C or D) in the numbered blank space on your ANSWER SHEET. DO NOT WRITE ON THIS TEST! To master this exam you must answer 36 out of 42 items correctly, (85 %).

EXAMINATION ON TASK 030 (#1-#8)
Identify the development steps in numerical control machining
(Fill in or check the proper word for the blank spaces)

1. The ______________ on blueprints or plans are used by craftsmen to manually control the movements of machine tools.

1. ________________

2. The introduction of ________________ probably had the greatest impact on the development of numerical control.

2. ___ Automobile
___ Mass Production
___ Lathe
___ Metal Cutting tools

3. The first successful demonstration of a three axis numerical control system was on a __________ machine.

3. ___ Lathe
___ Grinder
___ Milling Machine
___ Shaper

4. The time required for planning and tooling prior to producing a part is called:

4. ___ Down time
___ NC Efficiency
___ Lead time
___ Material Handling time

5. Machining time on a NC machine is ___________ a non NC machine.

5. ___ Less than
___ Equal to
___ Greater than

EXAMINATION ON TASK 030 (continued)

6. The basic system of measurement used in numerical control is?	6. ____ the origin ____ the plane ____ the graph ____ the cartesian coordinate system
7. The value of both the X and Y coordinates are + in the __________ quadrant.	7. ____________________
8. NC machines which are not capable of remembering where the origin or zero point is located are refered to having:	8. ____ Poor memory ____ Absolute positioning ____ Two axis positioning ____ Incremental positioning
9. The newer NC machines that have the capability to remember the starting point are called _____________ machines.	9. ____________________
10. On ordinate and tabular dimensioned part prints, the lower __________ corner of part drawing is considered the origin.	10. ______________________
11. Which axis is used the least amount on a NC Lathe?	11. ____ X ____ Y ____ Z ____ None of the above
12. The Z axis on a drill press or mill is?	12. ____ Parallel to XY plane ____ Adjoins the XY plane ____ Perpendicular to XY plane ____ Signifies rotary NC control

EXAMINATION ON TASK 030 (continued)

13. On a NC lathe, using the ______________ coordinate moves the cutting tool in toward the lathe bed.

13. ____________________

14. The Z axis on a NC vertical milling machine is in a ____________ direction.

14. ____________________

15. On a drill press, the depth of cut would be indicated as the ____________ coordinate.

15. ____________________

16. Which of the following choices describes a feature of contouring or continuous path NC machines.

16. ___ Circular movement
___ Encoded Worktable
___ Actuator Cups
___ Quadrant Selection

17. Which axis controls the depth of cut on contouring NC milling machines.

17. ___ X axis
___ Y axis
___ Z axis
___ J axis

18. The main difference between a plain NC machine and a NC machine capable of contour machining is the addition of a ___________.

18. ____________________

19. Boring a hole on a NC milling machine requires the location of the hole center and the _______ of the hole.

19. ____________________

20. The ______________ on a part print are used to determine the X, Y, and Z coordinates.

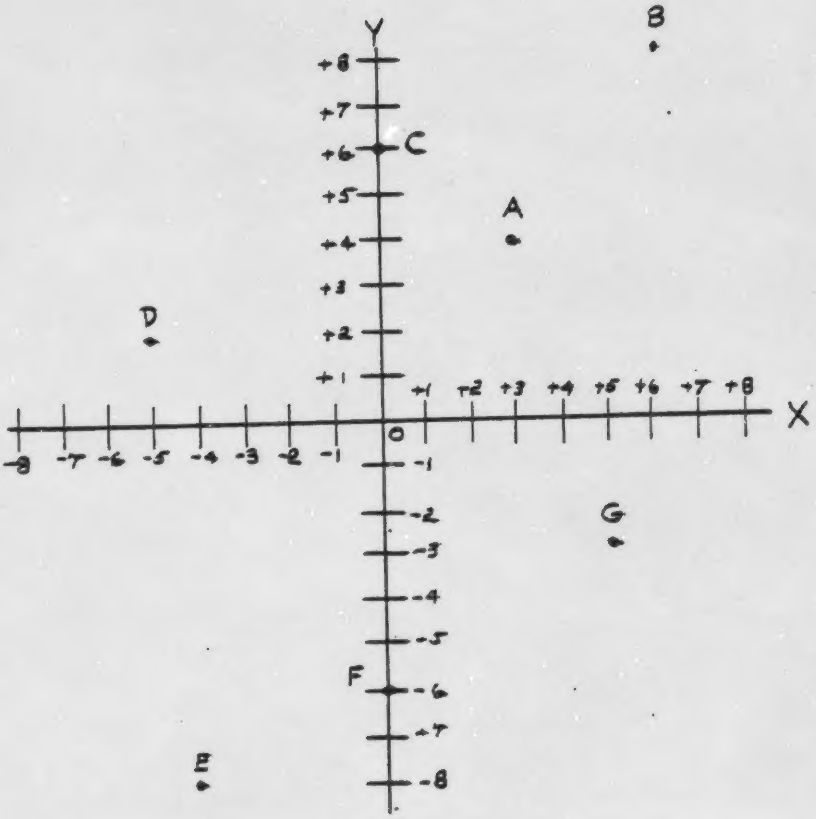
20. ____________________

EXAMINATION ON TASK 030 (continued)

		True	False
21. An NC machine operator needs more training than a machinist.	21.	______	______
22. Parts can be machined much faster on NC equiped machines.	22.	______	______
23. NC systems will completely eliminate machine operators.	23.	______	______
24. The NC punched tape is a coded duplication of dimensions on the part print.	24.	______	______
25. Feedback is necessary in a NC machine system.	25.	______	______
26. CNC machining systems do not need a codded punched tape.	26.	______	______
27. A part blueprint is not needed for NC machining.	27.	______	______
28. More safety related accidents occur on NC machines.	28.	______	______
29. NC machines reduce metal cutting time.	29.	______	______
30. NC machines cost more than non-NC machines.	30.	______	______
31. Absolute dimensions are dimensions that can never be changed.	31.	______	______
32. The NC Lathe does not have Y axis.	32.	______	______

EXAMINATION ON TASK #030 (continued)

33. through 39. Indicate the X and Y coordinates for points A through G in the figure below


Y
X
A
B
C
D
E
F
G
0
+1
+2
+3
+4
+5
+6
+7
+8
-1
-2
-3
-4
-5
-6
-7
-8

33. (A)

X=__________

Y=__________

34. (B)

X=__________

Y=__________

35. (C)

X=__________

Y=__________

36. (D)

X=__________

Y=__________

37. (E)

X=__________

Y=__________

38. (F)

X=__________

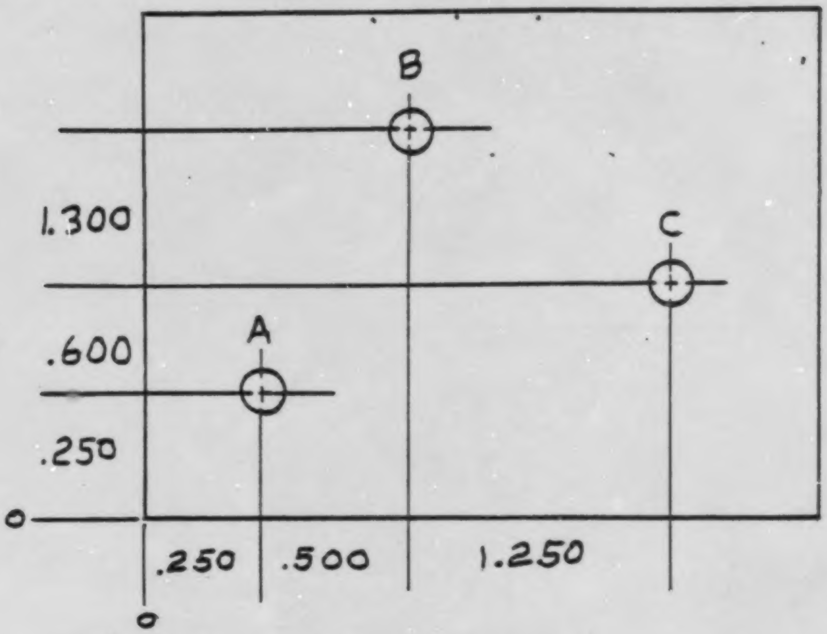
Y=__________

39. (G)

X=__________

Y=__________

Figure for questions 40-42.



40. What are the values for the X and Y coordinates for point, "C" using an absolute positioning machine?

40. X=________

Y=________

41. The X and Y coordinates for point "B" (after point "A") using an incremental positioning machine?

41. X=________

Y=________

42. The X and Y coordinates for point "C" (after point "B") using an incremental positioning machine?

42. X=________

Y=________

ANSWER KEY INTERMEDIATE OBJECTIVES

REVIEW EXERCISE #1

1. Operate Independently
2. Automatically Detect Variations
3. Automatically Adjust Controls
4. Dimensions
5. John T. Parson
6. Holes
7. Mass Production
8. Milling Machine
9. 90%
10. Punched Cards

Review Exercise #3

1. Lead time
2. Higher machine cost
3. Equal
4. False
5. False
6. False
7. False
8. True
9. True
10. True

REVIEW EXERCISE #4

1. Cartesian Coordinate system
2. Points position from origin
3. + -
4. Perpendicular
5. First
6. X=+3, Y=+4
7. X= +6, Y= +8
8. X= -5, Y= +2
9. X= -4, Y= -8
10. X= +5, Y= -3

REVIEW EXERCISE #5

1. Dimensions
2. Lines
3. Location
4. Poor memory
5. + Commands for X and Y
6. CNC
7. Corner
8. X= + 1.250, Y= +.250
9. X= + .250, Y= + 1.050
10. X= + .750, Y= - .700

REVIEW EXERCISE #6

1. Y
2. Cross slide on the carriage
3. Z
4. X
5. Vertical
6. Perpendicular to XY plane
7. -X
8. Z
9. Horizontal Mill
10. Y

REVIEW EXERCISE #8

1. Is not in contact with work piece when being moved from one point to another.
2. Milling operations
3. Picture fram milling
4. Circular movement
5. Z axis
6. computer
7. Diameter
8. Center
9. Arc's start point
10. Arc's finish point

ANSWER KEY TASK 030 FINAL EXAMINATION

1. Dimensions
2. Mass Production
3. Milling Machine
4. Lead time
5. Equal to
6. Cartesian coordinate system
7. First
8. Poor memory
9. CNC
10. Left
11. Y
12. Perpendicular to XY plane
13. -X
14. Vertical
15. Z
16. Circular movement
17. Z axis
18. Computer
19. Diameter
20. Dimensions
21. False
22. False
23. False
24. True
25. True
26. True
27. False
28. False
29. False
30. True
31. True
32. False
33. X = +3, Y = + 4
34. X = +6, Y = + 8
35. X = 0, Y = + 6
36. X = -5, Y = + 2
37. X = -4, Y = - 8
38. X = 0, Y = - 6
39. X = +5, Y = - 3
40. X = +1.250, Y = + .600
41. X = +.250 , Y = +1.500
42. X = +.750 , Y = -700

LCAVC

LAKE
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COMPETENCY-BASED INDIVIDUALIZED VOCATIONAL EDUCATION INSTRUCTION

STUDENT LEARNING GUIDE

Produced By W. Pouler Date 6/6/84

TASK: IDENTIFY NUMERICAL CONTROL (NC) AND COMPUTER NUMERICAL CONTROL (CNC)

PURPOSE: This guide will explain the NC tape specifications and codes. The preparatory - G - and miscellaneous - M - codes will also be explained. All of the data that is entered on the NC program sheet is illustrated. The block, decimal and zero suppression format is illustrated. Tool selection, speeds and feeds, and other data as shown on the program manuscript is explained.

MACHINE SHOP

Program	Task	Est.Time	Prereq.
48.0503	031	8 hours	030

LEARNING CONTRACT (optional)

1. STUDENT DATA

NAME ______________________ SOCIAL SECURITY NUMBER ______________

LENGTH OF CONTRACT (NORMAL TIME IN HOURS) ______________________

2. TERMINAL PERFORMANCE OBJECTIVE

Given:	The necessary information and a written exam
You will:	Identify NC and CNC input media
How well:	To master this task you must score 30 out of 35 and score 85 % on the exam

2a. INTERMEDIATE OBJECTIVE(s)

1. Identify tape specifications and coding
2. Identify basic functions controlled by NC and CNC (Sequence numbers, X, Y and Z words, decimal formats, zero depressions, preparatory codes - G, feed rates, spindle speeds, and miscellaneous codes - M)
3. Identify NC and CNC program examples (Block formats and rapid moves)
4. Interpret other functions controlled by NC and CNC (Linear interpolation - G01, circular interpolation - G02 & G03, programmable Z depth, tool length compensation, work plane, and program manuscripts)

3. AGREEMENT

I, ______________________ agree to complete the above stated terminal performance requirement within ____________ to ____________ I further recognize that the conditions of the contract (performance and time agreement) report my ability to perform the requirements of the occupation and record my progress.

Student's Signature ______________________

Instructor's Signature ______________________
(verifies competency)

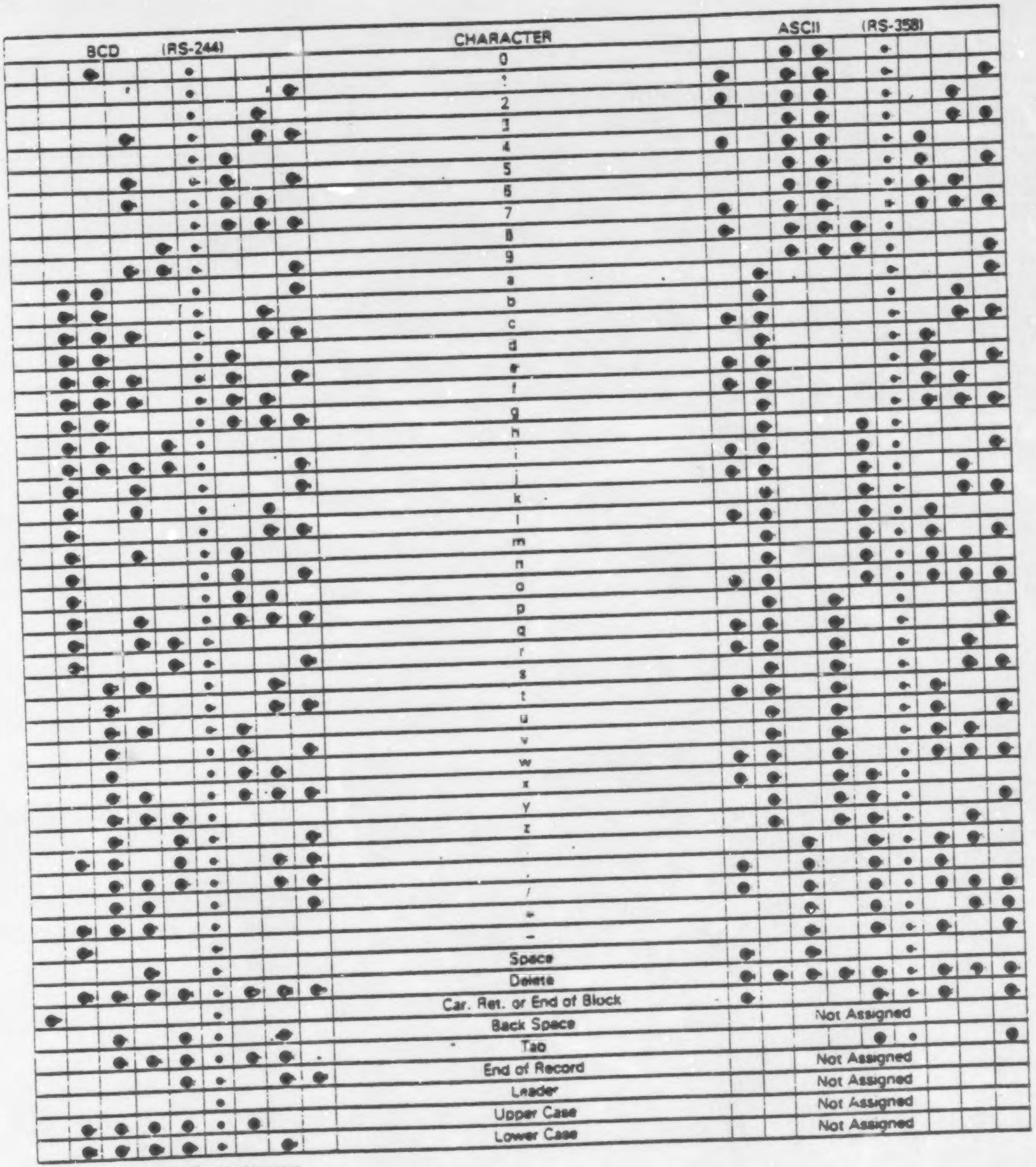
INTERMEDIATE OBJECTIVE #1

1. Identify tape specifications and coding

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #1 to learn about tape specifications and coding.	1. Pages 44-58, Fundamentals of Numerical Control, and information sheet #1, pages #4 & 5 in this learning guide.
2. Complete review exercise #1 listed in resource #2 to check your understanding of tape specifications and coding.	2. Review exercise #1, page #6 in this learning guide.
3. Use resource #3 to check your answers for exercise #1.	3. Answer sheet on page #31 in this learning guide.
4. Re-read resource #1 and correct any wrong answers on review exercise #1.	4. Pages 44-58, Fundamentals of Numerical Control, and information sheet #1, pages #4 & 5 in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #2, page #7 in this learning guide.

INFORMATION SHEET #1

Tape Coding Systems


BCD (RS-244)
CHARACTER
ASCII (RS-358)
0
1
2
3
4
5
6
7
8
9
a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q
r
s
t
u
v
w
x
y
z
.
,
/
+
–
Space
Delete
Car. Ret. or End of Block
Back Space
Tab
End of Record
Leader
Upper Case
Lower Case
Not Assigned

BCD - Binary Coded Decimal system
ISO - International Standards Organization
ASCII - American Standard Code for Information Interchange
The systems ISO and ASCII are the opposite of BCD in that the even-parity coded.

Fundamentals of Numerical Control, p. 50 .

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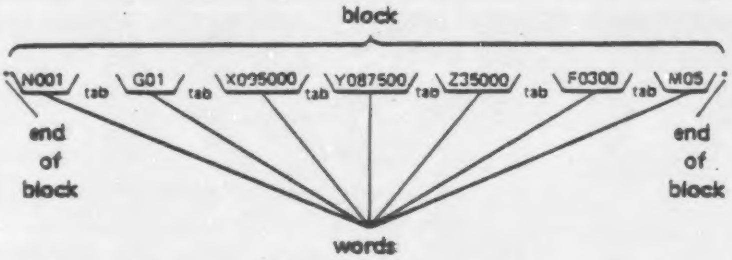
INFORMATION SHEET #1

English & NC Terms

ENGLISH STORY	N/C PROGRAM TERMS
sentence	block
word	word
letters	letters and numbers
spacing	tabs
punctuation	end of block


block
N001
tab
G01
tab
X035000
tab
Y087500
tab
Z35000
tab
F0300
tab
M05
end of block
end of block
words

Numerical Control for Machining, p. 38

Review Exercise #1

Tape Specifications and Coding

1. Name the four types of input media.

   1.__________________ 3.__________________

   2.__________________ 4.__________________

2. What are the three types of NC tape materials?

   1.__________________ 2.__________________ 3.__________________

3. How can you determine what code is punched on a tape?

   BCD:______________________ ASCII:______________________

4. A standardized NC tape is _____ inches wide with _____ tracks.

5. The most common type of tape format is the ______________ ______________.

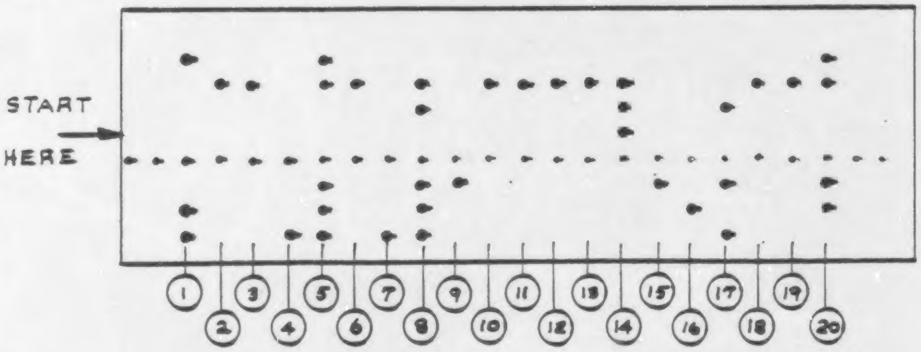
6. What are the two common methods of punching a tape?

   1.______________________ 2.______________________

7. What is the purpose of a tab code?

   ____

8. Decode the NC tape segment shown below. Read from left to right and indicate each character in the numbered spaces.



____	____	____	____	____	____	____	____	____	____
1	2	3	4	5	6	7	8	9	10
____	____	____	____	____	____	____	____	____	____
11	12	13	14	15	16	17	18	19	20

INTERMEDIATE OBJECTIVE #2

2. Identify basic functions controlled by NC and CNC

    1. Sequence numbers
    2. X, Y and Z words
    3. Decimal formats
    4. Zero depressions
    5. Preparatory codes - G
    6. Feed rates
    7. Spindle speeds
    8. Miscellaneous codes - M

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #1 to learn about basic functions controlled by NC and CNC.	1. Pages 59-70, Fundamentals of Numerical Control, and information sheet #2, pages #8-11 in this learning guide.
2. Complete review exercise #2 listed in resource #2 to check your understanding of basic NC and CNC controlled functions.	2. Review exercise #2, page #12 in this learning guide.
3. Use resource #3 to check your answers for review exercise #2.	3. Answer sheet on page #31 in this learning guide.
4. Re-read resource #2 and correct any wrong answers on review exercise #2.	4. Pages 59-70, Fundamentals of Numerical Control, and information sheet #2, pages #8-11 in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #3, page #14 in this learning guide.

INFORMATION SHEET #2

EIA and AIA National Codes

PREPARATORY FUNCTIONS

G Word	Explanation
G00	Used for denoting a rapid traverse rate with point-to-point positioning.
G01	Used to describe linear interpolation blocks and reserved for contouring.
G02 G03	Used with circular interpolation.
G04	A calculated time delay during which there is no machine motion (dwell).
G05 G07	Unassigned by the EIA. May be used at the discretion of the machine tool or system builder. Could also be standardized at a future date.
G06	Parabolic interpolation.
G08	Acceleration code. Causes the machine, assuming capability, to accelerate at a smooth exponential rate.
G09	Deceleration code. Causes the machine, assuming capability, to decelerate at a smooth exponential rate.
G10 G11 G12	Normally unassigned for CNC systems. Used with some hardwired systems to express blocks of abnormal dimensions.
G13 G14 G15 G16	Used to direct the control system to operate on a particular set of axes.
G17 G18 G19	Used to identify, or select, a coordinate plane for such functions as circular interpolation or cutter compensation.
G20 through G32	Unassigned according to EIA standards; however, they may be assigned by the control system or machine tool builder.
G33 G34 G35	Modes selected for machines equipped with thread-cutting capabilities and generally referring to lathes. G33 is used when a constant lead is sought. G34 is used when a constantly increasing lead is required, and G35 is used to designate a constantly decreasing lead.
G36 through G39	Unassigned.
G40	A command which will terminate any cutter compensation.

Fundamentals of Numerical Control, appendix

INFORMATION SHEET #2

G41	A code associated with cutter compensation in which the cutter is on the left side of the work surface, looking in the direction of the cutter motion.
G42	A code associated with cutter compensation in which the cutter is on the right side of the work surface.
G43 G44	Used with cutter offset to adjust for the difference between the actual and programmed cutter radii or diameters. G43 refers to an inside corner, and G44 refers to an outside corner.
G45 through G49	Unassigned.
G50 through G59	Reserved for adaptive control.
G60 through G69	Unassigned.
G70	Inch programming.
G71	Metric programming.
G72	Three-dimensional circular interpolation-CW.
G73	Three-dimensional circular interpolation-CCW.
G74	Cancel multiquadrant circular interpolation.
G75	Multiquadrant circular interpolation.
G76 through G79	Unassigned.
G80	Cancel cycle.
G81	Drill, or spotdrill, cycle.
G82	Drill with a dwell.
G83	Intermittent, or deep-hole, drilling.
G84	Tapping cycle.
G85 through G89	Boring cycles.
G90	Absolute input. Input data is to be in absolute dimensional form.
G91	Incremental input. Input data is to be in incremental form.
G92	Preload registers to desired values. An example would be to preload axis position registers.
G93	Inverse time feed rate.
G94	Inches (millimetres) per minute feed rate.
G95	Inches (millimetres) per revolution feed rate.
G97	Spindle speed in revolutions per minute.
G98 G99	Unassigned.

Fundamentals of Numerical Control, appendix

INFORMATION SHEET #2

MISCELLANEOUS FUNCTIONS

M Word	Explanation
M00	Program stop. Operator must cycle start in order to continue with the remainder of the program.
M01	Optional stop. Acted upon only when the operator has previously signaled for this command by pushing a button. When the control system senses the M01 code, machine will automatically stop.
M02	End of program. Stops the machine after completion of all commands in the block. May include rewinding of tape.
M30	End of tape command. Will rewind the tape and automatically transfer to a second tape reader if incorporated in the control system.
M03	Start spindle rotation in a clockwise direction.
M04	Start spindle rotation in a counterclockwise direction.
M05	Spindle stop.
M06	Command to execute the change of a tool (or tools) manually or automatically.
M07	Turn coolant on (flood).
M08	Turn coolant on (mist).
M09	Coolant off.
M10 M11	Automatic clamping of the machine slides, workpiece, fixture, spindle, etc. M11 is an unclamping code.
M12	An inhibiting code to synchronize multiple sets of axes, such as a four-axis lathe having two independently operated heads or slides.
M13	Combines simultaneous clockwise spindle motion and coolant on.
M14	Combines simultaneous counterclockwise spindle motion and coolant on.
M15 M16	Rapid traverse or feed motion in either the +(M15) or −(M16) direction.
M17 M18	Unassigned.
M19	Oriented spindle stop. Spindle stop at a predetermined angular position.
M20 through M29	Unassigned.
M31	A command known as interlock bypass for temporarily circumventing a normally provided interlock.
M32 through M39	Unassigned.
M40 through M46	Used to signal gear changes if required at the machine; otherwise, unassigned.

Fundamentals of Numerical Control, appendix

INFORMATION SHEET #2

M47	Continues program execution from the start of the program unless inhibited by an interlock signal.
M48	Cancel M49.
M49	A function that deactivates a manual spindle or feed override and returns to the programmed value.
M50 through M57	Unassigned.
M58	Cancel M59.
M59	A function which holds the RPM constant at its value when M59 is initiated.
M60 through M99	Unassigned.

OTHER ADDRESS CHARACTERS

Address Character	Explanation
A	Angular dimension about the X axis.
B	Angular dimension about the Y axis.
C	Angular dimension about the Z axis.
D	Can be used for an angular dimension around a special axis, for a third feed function or for tool offset.
E	Used for angular dimension around a special axis or for a second feed function.
H	Unassigned.
I J K	Used with circular interpolation.
L	Not used.
O	Used in place of the customary sequence number word address N.
P	A third rapid traverse code or tertiary motion dimension parallel to the X axis.
Q	Second rapid traverse code or tertiary motion dimension parallel to the Y axis.
R	First rapid traverse code or tertiary motion dimension parallel to the Z axis or the radius for constant surface speed calculation.
U	Secondary motion dimension parallel to the X axis.
V	Secondary motion dimension parallel to the Y axis.
W	Secondary motion dimension parallel to the Z axis.

Fundamentals of Numerical Control, appendix

Review Exercise #2

Basic Functions Controlled by NC and CNC

1. The three main parts of an NC program are
   1.________________ 2.________________ 3.________________

2. The first word in a block of information is the __________ __________.

3. The second bit of information on a block is the __________ __________.

4. The third, fourth and fifth bits of information on a block are the
   ________________, ______________ and ________________.

5. The sequence number can be ____________, ____________ or ____________.

6. How many decimal places does the coordinate information usually have? ________

7. A command of X + 127450 would read ____________ as a decimal number.

8. How many digit positions are available in X, Y and Z positions? ____________

9. In the X, Y and Z word format, + 0027455, the leading ____________ are insignificant and can be omitted.

10. The example shown in question #9 is called the __________, _______, ______.

11. Some NC systems have trailing zero suppression and + 0027400 would be written ________________.

12. The decimal equivalent of the number in question #11 would be ______________.

13. The word address letter for a preparatory function would be ______________.

14. Canned cycle in a preparatory function usually controls the ____________ moves.

15. Feed rates are measured in __________, __________, ____________.

16. A feed of F020 would be __________, __________, ____________.

17. Spindle speeds are measured in __________, ____________, ___________.

18. On an NC drill press or NC milling machine, the depth is controlled by the ______________ word.

19. The miscellaneous function for end of program would be __________________.

20. A change of tool would be the __________________ miscellaneous function.

21. Depth selection for NC machines that do not have tape-controlled Z-axis motion use __________, ____________ or ____________ to control depth.

INTERMEDIATE OBJECTIVE #3

3. Identify NC and CNC program examples
    1. Block format
    2. Rapid moves

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #1 to learn about NC and CNC program examples.	1. Pages 70-79, Fundamentals of Numerical Control, and information sheet #3, pages #14-16 in this learning guide.
2. Complete review exercise #3 listed in resource #2 to check your understanding of NC and CNC programs.	2. Review exercise #3, page #17 in this learning guide.
3. Use resource #3 to check your answers for exercise #3.	3. Answer sheet, page #31 in this learning guide.
4. Re-read resource #1 and correct any wrong answers on review exercise #3.	4. Pages 70-79, Fundamentals of Numerical Control, and information sheet #3, pages #14-16 in this learning guide.
5. Go to next intermediate objective.	5. Intermediate objective #4, page #18 in this learning guide.

INFORMATION SHEET #3

Typical NC Block Words

N	G	X	Y	Z	I	J	K	M	F	S	T	REMARKS

N — SEQUENCE NUMBER (Block number)

G — PREPARATORY FUNCTION

X — X COORDINATE MOVEMENT

Y — Y COORDINATE MOVEMENT

Z — Z COORDINATE MOVEMENT (W if cam operated)

I — CIRCULAR INTERPOLATION (X center point position)

J — CIRCULAR INTERPOLATION (Y center point position)

K — CIRCULAR INTERPOLATION (Z center point position)

M — MISCELLANEOUS FUNCTIONS

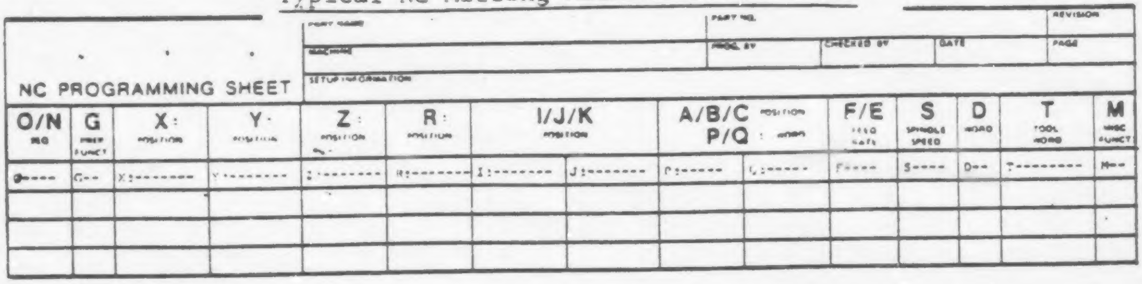
F — FEED RATE (tool)

S — SPEED RATE (tool)

T — TOOL NUMBER (0-9)

REMARKS — SPECIAL INSTRUCTIONS

INFORMATION SHEET #3
Typical NC Milling Machine Block Words



NC PROGRAMMING SHEET

PART NAME | PART NO. | REVISION
MACHINE | PROG. BY | CHECKED BY | DATE | PAGE
SETUP INFORMATION

O/N NO	G PREP FUNCT	X: POSITION	Y· POSITION	Z: POSITION	R: POSITION	I/J/K POSITION		A/B/C POSITION P/Q : WORD		F/E FEED RATE	S SPINDLE SPEED	D WORD	T TOOL WORD	M MISC FUNCT
O----	G--	X:--------	Y--------	Z--------	R:--------	I:--------	J:--------	P:------	Q:------	F----	S----	D--	T--------	M--

Word 1 **O/N**	Sequence number coding, introduced by O or N. It is a five-character code: one letter and four numerals (Oxxxx, or Nxxxx). It is used to identify a block of information. It is informational, rather than functional.
Word 2 **G**	Preparatory function coding, introduced by G. It is a three-character code: one letter and two numerals (Gxx). It is used for control of the machine. It is a command that determines the mode of operation of the system. This word is informational and functional. Therefore, all characters, except leading zeros, must be included in the code.
Word 3 **X**	X axis coordinate information code, introduced by X. It may contain up to nine characters: one letter, one sign, and up to seven numerals (X xxxx.xxx millimetres). Six numerals are normally used. This word is used to control the direction of table travel and position.
Word 4 **Y**	Y axis coordinate information coding, introduced by Y. This is identical to Word 3, only using the Y address.
Word 5 **Z**	Z axis coordinate information coding, introduced by Z. This is identical to Word 3, only using the Z address.
Word 6 **R**	Z axis coordinate information coding, introduced by R. It may contain up to nine characters: one letter, one sign, and up to seven numerals (R xxx.xxxx inches, R xxxx.xxx millimetres). It is used to control the positions of the Z slide at rapid traverse during positioning mode.
Word 7 **I**	The center point coordinate in circular interpolation of the X axis is introduced by I. It may contain up to nine characters in the coding: one letter, one sign, and up to seven numerals (I xxx.xxxx inches, I xxxx.xxx millimetres).
Word 8 **J**	The center point coordinate in circular interpolation of the Y axis is introduced by J. This is identical to Word 7, only using the J address.

INFORMATION SHEET #3

Typical NC Milling Machine Block Words (continued)

Word 9 K	The center point coordinate in circular interpolation of the Z axis is introduced by K. This is also identical to Word 7, only using the K address.
Word 10 B	Beta axis coding of the *index table,* introduced by B. This is a seven-character code: one letter and six numerals (Bxxx.xxx). It determines the angular position of the index table.
Word 11 P	The X axis projection, of the cutter diameter compensation vector, introduced by P. It is a seven-character code: one letter, one sign, and five numerals (Px.xxxx). It describes the CDC unit vector value for the X axis (optional feature).
Word 12 Q	The Y axis projection, of the cutter diameter compensation vector, introduced by Q. This is identical to Word 11, only using the Q address (optional feature).
Word 13 F	Feed rate coding for X, Y and/or Z axes, introduced by F. It may contain up to five characters in the code: one letter and up to four numerals (Fxxx.x inches/minute, Fxxxx millimetres/minute). It is used for controlling the rate of longitudinal, vertical, and cross travel. The F word is also used in conjunction with the G04 code to dwell the slides. In this mode, the format can vary from .01 second to 99.99 seconds of dwell.
Word 14 S	Spindle speed coding for rate of rotation of the cutting tool, introduced by S. It may contain up to five characters in the code: one letter and up to four numerals (Sxxxx). This is the actual RPM desired for cutting.
Word 15 D	Tool trim coding of the tool axis is introduced by D. It may contain up to three characters in the code: one letter and up to two numerals (Dxx). This selects the stored value to be applied to the Z axis positions for a given operation (optional feature).
Word 16 T	Tool number coding introduced by T. It is a nine-character code: one letter and eight numerals (Txxxxxxxx). It determines the next tool to be used.
Word 17 M	Miscellaneous function coding, introduced by M. It is a three-character code: one letter and two numerals (Mxx). It is used for various discrete machine functions.

Review Exercise #3

NC and CNC Program Examples

1. The first enteree in the NC block format is the ____________________.

2. The second enteree in the NC block format is the ____________________.

3. In order to get the proper depth for a drilled hole, a value of ___________ X ___________ must be added to the Z coordinate.

4. In order for the cutting tool to clear the cutting surface of the part when it is moving from one position to the next, the Z coordinate is usually set to a ___________ ___________.

5. An NC machine dwell control is usually used on a __________ hole.

6. The faster tool or table location movements are called ____________________.

7. On an NC machine without a canned 684 cycle, a ________________ function would be used when extracting a tap.

8. _______________ codes are effective only in the specific block being programmed.

9. In a canned __________ cycle - G __________, the spindle will automatically reverse the spindle direction at the end of the machining operation.

10. The last function to enter on a program is the ____________________.

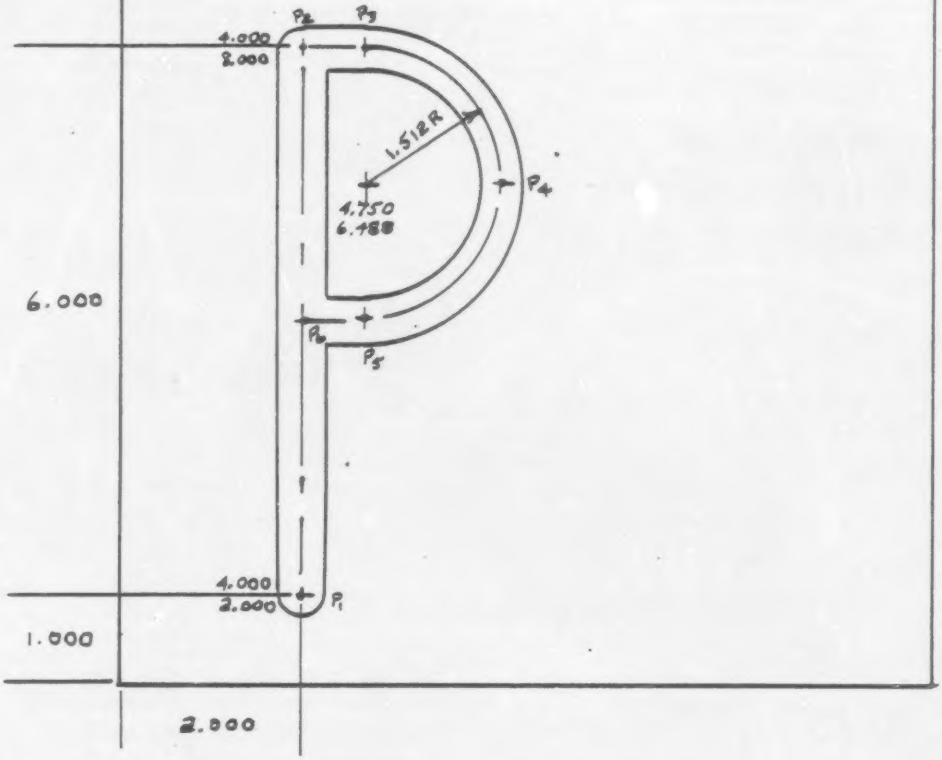
INTERMEDIATE OBJECTIVE #4

4. Interpret other functions controlled by NC and CNC

   1. Linear interpolation - G01
   2. Circular interpolation - G02 & G03
   3. Programmable Z depth
   4. Tool length compensation
   5. Work plane
   6. Program manuscripts

LEARNING STEPS (Activities)	RESOURCES
1. Read resource #1 to learn about other NC functions.	1. Pages 80-96, Fundamentals of Numerical Control, and information sheet #4, pages 19-24 in this learning guide.
2. Complete review exercise #4 listed in resource #2 to check your understanding of other NC functions.	2. Review exercise #4, pages #25 & 26 in this learning guide.
3. Use resource #3 to check your answers for exercise #4.	3. Answer sheet, page #31 in this learning guide.
4. Re-read resource #1 and correct any wrong answers on review exercise #4.	4. Pages 80-96, Fundamentals of Numerical Control, and information sheet #4, pages 19-24 in this learning guide.
5. Complete criterion exam for task #031 identified in resource #5.	5. Criterion exam "Identify NC and CNC Input Media", pages 27-30 in this learning guide.

INFORMATION SHEET #4


P2
P3
4.000
2.000
1.512R
P4
4.750
6.488
6.000
P6
P5
4.000
2.000
P1
1.000
2.000

0,0
START
POINT

N.C. PROGRAMMING

```
                                                            Inch mode
      G70
H001  G00  X +040000  Y +020000                              Rapid to P1
N002  G85                          Z +002500  M03 S611 F4.8 Feed cutter
N003  G01  X +040000  Y +080000                             Mill slot to P2
N004  G01  X +047500  Y +080000                             Mill slot to P3
N005  G01  X +048340  Y +078160  First plot of linear interp. to P4
           17 More plot points to P4
N022  G01  X +062620  Y +064880  First plot of linear interp. to P5
           17 More plot points to P5
N039  G01  X +047500  Y +049520                                   P5
N040  G01  X +040000  Y +049520                               P5 to P6
N041                               Z +000000  M05           Retract cutter
N042  G00  X +000000  Y +000000                             Rapid to start
```

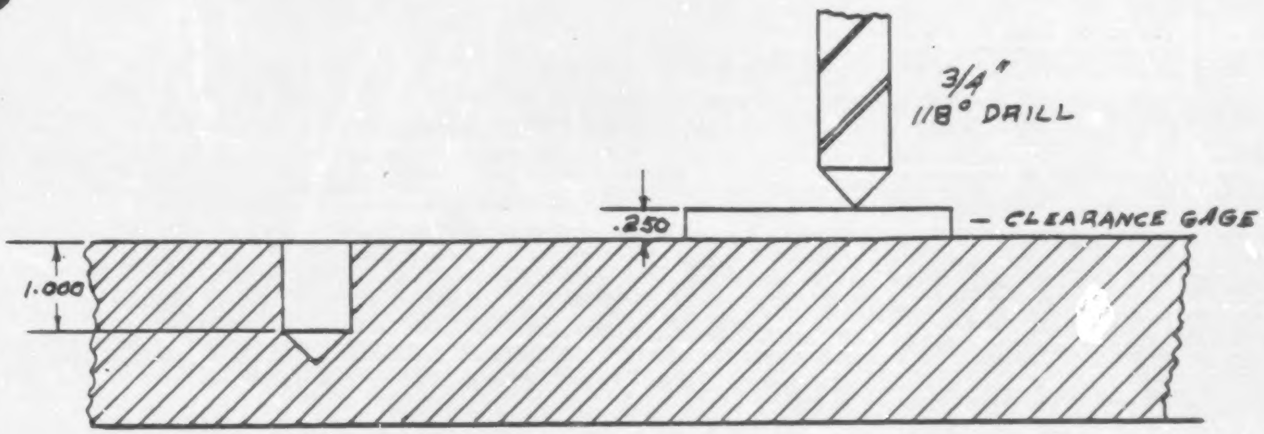
Linear Interpolation - ½" End Mill

N.C PROGRAMMING

```
        G70                                                              Inch mode
H001    G00   X +040000   Y +020000                                      Rapid to P1
N002    G85                         Z +002500  M03   S611   F4.8         Feed cutter
N003    G01   X +040000   Y +080000                                     Mill slot to P2
N004    G01   X +047500   Y +080000                                     Mill slot to P3
N005    G02                         I +047500  J +064880                Start point P3
N006    G02   X +062620   Y +064880 I +047500  J +064880                Finish Point P4
N007    G02   X +047500   Y +049520 I +047500  J +064880                Finish point P5
N008                                Z +000000  M05                      Retract cutter
N009    G00   X +000000   Y +000000            M02                      Rapid to start
                                                                        End of program
```

Circular Interpolation (Same operation as on page 19)

INFORMATION SHEET #4


3/4"
118° DRILL
.250
— CLEARANCE GAGE
1.000

Z Depth - Work Plane Calculations

Work Plane = 2.000
Depth of Cut + 1.000
Clearance + .250
Drill Point
Adjustment + .225 *
Total Z Value = 3.475

* Drill point adjustment = .3 x drill diameter
(.3 x .750 = .225

INFORMATION SHEET #4

PREPARED BY	DATE
CHECKED BY	DATE
SHEET OF	TAPE NO.

Bridgeport TEXTRON

Bridgeport Machines Division of Textron Inc.

PART NO.
PART NAME
COMPANY NAME

NUMERICAL CONTROL PROGRAM

NOTES	N	G	X/Y	X/Y/Z	Y/Z/I/J	Y/Z/J/K	F	S	T	M

INFORMATION SHEET #4

Full Page Manuscript (Z axis "W" is Cam Controlled)

CINCINNATI ACRAMATIC SERIES 5 225	PART NAME				PART NO.
	DRAWING NO.	REVISION	FIXTURE NO.	PROGRAMMED BY	PAGE OF PAGE
	SET UP AND TOOL INFORMATION				DATE

H/O or N SEQ. NO.	G PREP. FUNCT.	X POSITION	Y POSITION	I POSITION	J POSITION	F FEED RATE	ROTARY TABLE	ROTARY FEED RATE	W CAM	MISC. FUNCT	POS. NO.	SPD. FD.	RPM	DEPTH OF CUT	REMARKS
N81		X + 0	Y + 6.0000	I + 0	J + 0						P5				
N82		X + 6.0000	Y + 0	I + 0	J + 0						P2				
N83	G81									M26	P2				
O84	G80	X + 5.2774	Y − 3.6963			F18.0			W1		P14	8	1500	.3125	2" END MILL
N85	G79										P14				
N86		X + 5.2542	Y − 3.6791								P14				
N87		X + 3.6791	Y + 5.2542								P15				
N88		X − 5.2542	Y + 3.6791								P16				
N89		X − 3.6791	Y − 5.2542								P17				
N90		X + 5.2542	Y − 3.6791								P14				
N91	G81									M06	P14				
O92	G81	X + 4.3750	Y − 4.3750			F15.0			W5		P18	15	1500	1.125	59/64 DRILL
N93		X − 4.3750	Y + 4.3750								P20				
N94		X + 4.3750									P19				
N95		X − 4.3750	Y − 4.3750							M06	P21				
O96	G84	X − 4.3750	Y − 4.3750			F15.0			W6		P21	15	220	Approx.	3/4-14 PIPE TAP
N97		X + 4.3750	Y + 4.3750							M06	P19				
O98	G85	X − 4.3750	Y + 4.3750			F10.0			W7		P20	10	2100	.500	1" CARB. BORE
N99		X + 4.3750	Y − 4.3750							M06	P18				
O100	G81	X + 2.5000	Y − 2.5000			F15.0			W8		P22	15	2100	.875	5/16 DRILL
N101		X − 2.5000	Y + 2.5000							M06	P23				
O102	G84	X − 2.5000	Y + 2.5000			F21.0			W9		P23	21	380	.375	3/8-16 N.C. TAP
N103		X + 2.5000	Y − 2.5000								P22				
N104	G80	X + 0	Y + 8.0000							M02	P24				UNLOAD

Fundamentals of Numerical Control. p. 78

INFORMATION SHEET #4

PROGRAMMING FORM

Drwg. No.
Op. No.
Machine
Page of
Designation
Material
Dim.
Date Sign

N	G	F	S	T	M	X	Y	Z	I	J	K

Review Exercise #4

Other Functions Controlled by NC and CNC

1. What is the main disadvantage of linear interpolation.

____

2. What four items must be programmed in circular interpolation?

1. ____________________ 3. ____________________

2. ____________________ 4. ____________________

3. Using circular interpolation, arcs up to ________ degrees can be handled by the controls in one block of information.

4. With circular interpolation, the I word is the ______________ coordinate. the J word is the ____________ coordinate, and the K word is the ______________ coordinate.

5. When using the formula Z = PS + CC + TL for the programmable Z depth, the following holds true:

______ = distance from Z0 to spindle gage line

______ = clearance (if needed)

______ = distance from Z0 to part surface

______ = tool set length from spindle gage line to cutting edge

6. In order to allow for tool length compensation, most companies ______________ their tools.

7. The R work plane is concerned with the ________________ coordinate.

8. In sequential tooling, the tools are accessed in the ______________ order they are used in the NC program.

9. To determine the Z depth of a 118° drill, a factor of ___________ is multiplied by the drill diameter.

10. The programmed depth of a 118° drill of .750 diameter with a .250 clearance and drilled to .750 inches depth would be ________________.

Review Exercise #4

Other Functions Controlled by NC and CNC (continued)

11. Match the NC programmed words with the word definitions.

a. feed rate ____ 1. N

b. circular interpolation - X ____ 2. G

c. sequence number ____ 3. X

d. Y coordinate movement ____ 4. Y

e. miscellaneous function ____ 5. Z

f. circular interpolation - Y ____ 6. I

g. X coordinate movement ____ 7. J

h. speed rate ____ 8. K

i. Z coordinate movement ____ 9. M

j. circular interpolation - Z ____ 10. F

k. tool number ____ 11. S

l. preparatory function ____ 12. T

PROGRAM Machine Shop

CRITERION EXAM

TASK # 031

DIRECTIONS:

THE PURPOSE OF THIS EXAM IS TO DETERMINE WHETHER OR NOT YOU HAVE UNDERSTOOD THE INFORMATION ON ____________

Identify NC and CNC Input Media

Each of the questions or incomplete statements below is followed by several words, phrases, or a series of numbers. Choose the one which best answers the question or completes the statement correctly. Place the letter associated with that choice (A,B,C or D) in the numbered blank space on your ANSWER SHEET. DO NOT WRITE ON THIS TEST!!! To master this exam you must answer 30 out of 35 items correctly, 85 %.

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Examination on Task 031 (#1 - #4)

(Fill in or check the proper word for the blank spaces)

1. What are the three types of NC tape materials?

   1.____________________ 2.__________________ 3.____________________

2. The NC tape using the ASCII code has an ___________________ number of holes across the tape.

3. The tab code is used to the ______________ and ________________ of the block of information.

4. A standardized NC tape has room for ________ punched holes across the tape.

5. The first word in a block of information is the _______________.

6. A command of X + 028250 would read ________________ as a decimal number.

7. How many digit positions are available in X, Y and Z positions? _______________

8. The word address for a preparatory function would be ____________________.

9. On an NC drill press or NC milling machine, the depth is controlled by the __________________ word.

10. The code used for rapid moves on X and Y positioning is ____________________.

11. The code used for inch programming is _______________________.

12. The code used for end of programming is _______________________.

13. The code used for linear interpolation is _______________________.

14. The codes used for circular interpolations are ____________ and ______________.

15. The I, J and K words are used for _____________________.

16. The three words used for sequence numbers are ______________, _______________ and __________________.

17. The tool feed rate is indicated by the ___________________ word.

18. The tool feed rate is measured in _______________ per _____________.

19. To compensate for depth of a drilled hole, a factor of _____ X drill diameter is added to the depth movement.

Examination on Task 031 (#1 - #4) - continued

20. The I word in circular interpolation is the ________________ coordinate.

21. Match the NC programmed words with the word definitions:

a. circular interpolation - X _____ 1. H
b. X coordinate movement _____ 2. G
c. preparatory function _____ 3. X
d. feed rate _____ 4. Y
e. sequence number _____ 5. Z
f. Z coordinate movement _____ 6. I
g. tool number _____ 7. J
h. speed rate _____ 8. K
i. Y coordinate movement _____ 9. M
j. circular interpolation - Y _____ 10. F
k. miscellaneous function _____ 11. S
l. circular interpolation - Z _____ 12. T

22. Linear interpolation required ______________ (more, same, less) entrees in the program manuscript than circular interpolation.

23. The actual machining time on an NC controlled machine is ______________ (more, same, less) than a non-NC controlled machine.

24. An NC controlled lathe has ______________ (1, 2, 3, 4) tool movements.

25. Metal cutting feeds and speeds are not important NC operations. ___T ___F

26. The ASCII tape code uses an even mode. ___T ___F

27. The miscellaneous code for a tool change is M02. ___T ___F

28. The G00 function is used for rapid moves. ___T ___F

29. The continuous row of small holes in an NC tape is used to control the tool movements. ___T ___F

30. All NC program manuscripts are the same. ___T ___F

31. The G70 word is for the decimal inch mode. ___T ___F

32. An NC controlled machine costs more than a non-NC controlled machine.
___T ___F

33. The standard NC tapes have seven tracks. ___T ___F

34. On NC programs, decimal inch numbers have four decimal places. ___T ___F

35. Canned cycles in the preparatory functions control the rapid moves. ___T ___F

Answer Sheet -- Intermediate Objectives

Review #1

1. Manual, punched card, magnetic tape, punched tape.
2. Paper, mylar, foil.
3. BCD:odd number of holes
   ASCII: even number of holes.
4. One inch, eight tracks.
5. Word address.
6. Typewrier punch, computer punch.
7. Separate words.
8. N001 G01 X40000 Y42500 F0

Review #2

1. Heading, machine tape information, operator information.
2. Sequence number.
3. Preparatory function.
4. X, Y and Z words.
5. N, O or H.
6. Four
7. 12.7450.
8. Seven.
9. Zero's.
10. Leading zero suppression.
11. 00274.
12. 2.7400.
13. G
14. Rspid.
15. Inches per minute.
16. 20 inches per minute.
17. Rotationms per minute.
18. Z.
20. M02
21. M06.
22. Cams, electronically control stops, micrometer stops.

Review #3

1. Sequence number.
2. G code function.
3. .3 x drill diameter.
4. Gage height.
5. Counterbored.
6. Rapid movements.
7. M04.
8. Nonmodal.
9. Tap cycle - G84.
10. M02 - end of program.

Review #4

1. More steps in the program.
2. Prepatory function (G02)(G03)
   start point
   center point
   end point.
3. 90.
4. I=X, J=Y, and K=Z.
5. Z, CL, PS, TL.
6. Preset.
7. Z.
8. Exact.
9. .3.
10. 1.225.
11. F,I,(N,H,O),M,J,X,S,Z.K,T,G.

Answer Sheet - Examination On Task 031

1. Paper,mylar,foil.
2. Even.
3. Beginning, end.
4. 8.
5. Sequence number.
6. 2.825.
7. 4.
8. G.
9. Z.
10. G00.
11. G70.
12. M02.
13. G01.
14. G02, G03.
15. Circular interpolation.
16. N, O, H.
17. F.
18. Inches per minute.
19. .3.
20. X.
21. a-I, b-X, c-G, d-F, e-N,H,O, f-Z, g-T, h-S, i-Y, j-J, k-M, l-K.
22. More.
23. Same.
24. 2.
25. False.
26. True.
27. False.
28. True.
29. False.
30. False.
31. True.
32. True.
33. False.
34. True.
35. True.

Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Research and Development Section

Product Abstract

1. Title of material Employer/Employee Skill Survey

2. Date material was completed December 1983

3. Please check one: New material X Revised material ____ Field-tested material ____

4. Originating agency Lake County Area Vocational Center

Address 19525 W. Washington St.
Grayslake, IL Zip Code 60030

5. Name(s) of developer(s) Richard Glogovsky

Address 315 Fox Run Road Libertyville, IL Zip Code 60048

6. Developed pursuant to Contract Number R-99-14-X-0313-499

7. Subject Matter (Check only one according to Department of Education Code):

Code

____ 01 Agricultural Education
____ 03 Business and Office Education
____ 04 Distributive Education
____ 07 Health Occupations Education
____ 09 Home Economics Education
____ 10 Industrial Arts Education
____ 16 Technical Education
____ 17 Trade and Industrial Education
____ 22 Cooperative Education
____ Career Education
X Other (Specify) Skills questionaire

8. Education Level:

____ Pre-K Thru 6
____ Post-Secondary
____ Administrator (Pre-Service)
____ 7-8
____ Adult
____ 9-10
____ Teacher (Pre-service)
X Other (Specify) Research form
____ 11-12

9. Intended for Use By:

____ Student
X Teacher Educator
X Classroom Teacher
X Guidance Staff
X Local Administrator
X State Personnel
____ Other (Specify) ____

10. Student Type:

N-A

____ Regular
____ Limited-English Proficiency
____ Disadvantaged
____ Handicapped
____ Other (Specify) ____

11. Medium and Format of Materials:

X HARDCOPY
No. of pages 2
X Paper bound
____ Hard bound
____ Loose-leaf

____ VIDEOTAPE
____ Minutes
____ B & W
____ Color
____ inches

____ FILM
____ Minutes
____ B & W
____ Color
____ mm

____ MICROFICHE
____ B & W
____ Color

Photos: Yes ____ No ____
Diagrams: Yes ____ No ____

N-A

___SLIDES
No of frames ___
___B & W
___Color
___Audio
___Carousel provided
___Other packaging used
(Specify) ___

___FILM STRIPS
No of frames ___
___B & W
___Color
___Audio

___AUDIO
___Automatic synch
___ ___Hz
___Manual cue
___Reel
___Cassette
___Cartridge

___OTHER
Specify:
___
___
___

---

12. Availability:

X One copy free
For sale @ $___ per copy
___Not available
___In ERIC system (No.___)
___Loan copy available

Contact: Name Richard Glogovsky Phone (312) 223-6681
Lake County Area Vocational Center
Address 19525 W. Washington St. Zip Code 60030

13. Copyright Restrictions:

None
Contact: Name___ Phone ( )___
Address___ Zip Code___

14. What level(s) of assistance is required to provide implementation of this outcome?

___awareness X understanding
X deciding ___implementing

15. Are Consultive/Inservice (or staff development) available? Yes___ No___

Contact: Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Research and Development Section, E-426
100 North First Street
Springfield, IL 62777
(217) 782-4620

16. General Description (State the general objective and suggested method of use. Summarize the content and tell how it is organized. Write the description so that it can be used to promote the material. Continue on back of this sheet or on another sheet, if necessary.)
Answer Below

17. Person Completing this Abstract: Richard Glogovsky

Full Address:
Lake County Area Vocational Center (312) 223-6681
19525 W. Washington St.
Grayslake, IL Zip 60030

16. The purpose of this employer/employee survey is to identify the types of skills or tasks that might be required of those employees involved in new tech production methods. This survey can be helpful to those agencies or vocational institutions searching for this type of information.

LAKE COUNTY AREA VOCATIONAL CENTER
19525 West Washington Street
Grayslake, Illinois 60030
(312)223-6681

High Technology Training Project
1983-84

EMPLOYER/EMPLOYEE SURVEY

October 1983

Dear Employee,

The Lake County Area Vocational Center, a secondary vocational education training center located in Grayslake, has recently been awarded a research grant by the Illinois State Board of Education. The main objective of the grant is to identify a series of learning activities by which education programs at high school level can be designed to better prepare students for entrance into the world of high tech work or advanced high tech program training.

We need your assistance! In order to integrate new high tech curriculum into existing high school programs, we need input from business and industry. We want to identify the types of skills or tasks that are required of those employees involved in those so-called high technology production methods, and the kinds of preparatory skills that should be acquired at the high school level.

For the purpose of this survey, high tech manufacturing and business methods might be identified as:

1. Computer Assisted Design & Drafting (CADD)
2. Computer Assisted Manufacturing (CAM)
3. Computer Numerical Control (CNC)
4. Microcomputer/Computer
5. Microcomputer Troubleshooting & Repair
6. Microelectronics/Telecommunications
7. Robotics
8. Fiber Optics
9. Laser Beam
10. Medical Technology
11. Plastics Technology
12. Automated Word Processing
13. Horticultural/Agricultural Research
14. Energy Conservation

We would greatly appreciate it if you would complete the attached survey form and return it to your division manager as soon as possible. The results will play a big role in developing the course materials which future Illinois high school students will use to prepare them for the high tech world of tomorrow.

Thank you for your help!

Sincerely,

Richard W Glogovsky

Richard W. Glogovsky
High Tech Training Project Director
Lake County Area Vocational Center

6. What type of instructional equipment should be utilized in a high school setting to prepare students for employment in the category checked in question #3?

A. ____________________

B. ____________________

C. ____________________

D. ____________________

E. ____________________

F. ____________________

7. What characteristics are desired in those who enter this high tech occupation?

___A. High school graduate
___B. One-year post-high school certificate
___C. Associate two-year degree
___D. Baccalaureate degree
___E. Master's degree
___F. Other (please specify) ____________

8. Would you be willing to:

A. Identify additional items for this occupational area? ___Yes ___No

B. Serve on an advisory committee for this occupational area? ___Yes ___No

If so, please include your name ____________________

address ____________________

city/state/zip ____________________

work phone (   ) ____________________

home phone (   ) ____________________

THANK YOU FOR YOUR ASSISTANCE!

LAKE COUNTY AREA VOCATIONAL CENTER

High Technology Training Project
1983-84

EMPLOYER/EMPLOYEE SURVEY

Instructions: Please complete the survey information requested below and return to your firm's representative:

____

PLEASE PRINT

Name of Business/Industry ____________________

Address ____________________

City/State/Zip ____________________

1. What is the principal product/service produced or performed within your department?

A. ____________________

B. ____________________

2. List the title of the position in which you are employed.

A. ____________________

3. Check the specific high tech category in which your responsibility is related.
Note: If you check more than one area, please complete a separate survey for each category checked.

___A. Computer Assisted Design & Drafting
___B. Computer Assisted Manufacturing
___C. Computer Numerical Control
___D. Microcomputer/Computer
___E. Microcomputer Troubleshooting and Repair
___F. Microelectronics/Telecommunications
___G. Robotics
___H. Fiber Optics
___I. Laser Beam
___J. Medical Technology
___K. Plastics Technology
___L. Automated Word Processing
___M. Horticultural/Agricultural Research
___N. Energy Conservation
___O. Other ____________________

4. What types of automated high tech equipment do you utilize in your position?

A. ____________________

B. ____________________

C. ____________________

5. What general competencies (knowledge or skills) should be taught at the high school level to prepare students for the category checked in question #3?
(Check all that apply and list specific competencies for each area checked.)

Example: ✓ A. Mathematics Type: technical

Specific knowledge or skills:
multiplication
division
decimals
percentage

___ A. Mathematics Type: ______

Specific knowledge or skills: ______

___ B. Electricity/Electronics Type: ______

Specific knowledge or skills: ______

___ C. Applied Chemistry Type: ______

Specific knowledge or skills: ______

___ D. Applied Physics Type: ______

Specific knowledge or skills: ______

___ E. Applied Biology Type: ______

Specific knowledge or skills: ______

5. (continued)

___ F. Computer Literacy Type: ______

Specific knowledge or skills: ______

___ G. Equipment Operation

Specific technical skills as identified in question #4: ______

___ H. Equipment Operation

Specific technical knowledge as identified in question #4: ______

Others (please list)

___ I. ______

Specific knowledge or skills: ______

___ J. ______

Specific knowledge or skills: ______

Note: If additional space is needed, please feel free to use the space below.

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MAJOR ACCOMPLISHMENTS

Major Dissemination Activities

Staff Development

Publicity

Statement of Impact

Conclusions and Recommendations

Major Accomplishments of the Project:

1. An "Education for Technology Employment" advisory (consortium) committee was formed and utilized to help identify those preliminary skills required of employees involved in new technology.
2. An employer/employee survey instrument was developed and distributed to various high tech businesses and industries in Lake County. The results of the survey identified the preparatory skills required of employees involved in new technology employment.
3. A labor market trends and analysis was made of both the Machine Shop Program (CNC) and the Secretarial Office Program (word processing) areas.
4. A cooperative climate between LCAVC and the community college and feeder districts was enhanced through a series of articulation meetings conducted throughout the year.
5. A competency-based curriculum was developed for both the Secretarial Office Occupations and Machine Shop programs. New technology in the area of word processing was integrated into the Secretarial curriculum and computer numerical control (CNC) was integrated into the Machine Shop curriculum. Sample learning guides were developed in each of the areas.
6. Appropriate new technology equipment was identified and purchased for the Center's Machine Shop Program and Secretarial Office Program areas.
7. Lake County Area Vocational Center staff and in particular, Secretarial and Machine Shop instructors, were involved in a series of in-service workshops. These workshops helped to provide them with the skills/knowledge for integrating new technology into their program curriculum.
8. The project also enabled the Center to develop a better relationship with business and industry which fostered tremendous growth in the Center's extended campus training program.

Major Dissemination Activities Summary

1. Outcomes disseminated - the outcomes and information disseminated were:
    a. High tech task listings, suggested high tech program curriculum with student activities, and sample student learning guides for the Secretarial Office Occupations Program (Word Processing) and Machine Shop Program (Computer Numerical Control).
    b. Alternative type of staff in-service plans for instructors of high tech programs.
2. Target Audiences:
    a. Comprehensive high school vocational directors, counselors and faculty.
    b. Area vocational center directors, counselors and faculty.
    c. Community college vocational-technical administrators, department and division chairs and vocational technical, and occupational faculty.
    d. University administrators, occupational department chairs and occupational training faculty.

Staff Development Activities

Staff development activities were conducted on a continuous basis during the 83-84 school year. Participants included instructors from the feeder districts as well as from the Vocational Center. Twenty-two Center staff members participated in workshops related to updating their curriculum. Some of those Vocational Center staff involved in inservice training included:

a. Janet Robinson - Secretarial Office Occupations
   Jan attended a 1-week workshop in Chicago, IL on Word Processing presented by IBM Corporation.

b. Steve Gurevitz - Machine Shop
   Steve attended a 1-week workshop in Itasca, IL on Computerized Numerical Milling Machine Operation.

c. Ray Snider - Electronic Equipment Repair
   Ray attended several 1-week workshops on the usage of Microcomputer repair test equipment. The workshops were sponsored by Aidex Corporation in Downers Grove, IL and Apple Corporation in Rolling Meadows, IL.

d. Melvin Whitmer - Industrial Electrical Maintenance
   Melvin attended a 1-week Robotics conference held in South Carolina.

e. Duane Adamski and Jeff Brierton - Auto Body Repair
   Both instructors attended a 1-week seminar in Naperville, IL on Gas Metal Arc Welding.

f. Richard Stevens - Auto Service (diesel)
   Richard attended a 1-week diesel injection school in Milwaukee, Wisconsin.

g. Gary James - Graphic Communications
   Gary attended a 3-day graphics workshop in Chicago, IL.

h. Marjorie Lambert, Barb Rundquist and Connie Stamer - Cosmetology

All three staff members attended a two-day seminar related to new styling techniques.

Publicity

In general, the goals set forth in the proposal were accomplished. Additional time will be required in order to validate the machine shop competencies. The materials developed during the course of the year have not been published in a professional format as suggested in the Program Management Handbook. Materials will be organized in a more pleasing format as the content is placed in final form.

Statement of Impact

The new technology curriculum materials developed during the 83-84 school year are very useful to vocational-technical teachers and administration in updating their existing Vocational programs. This material will help to make Vocational Programs more relevant with today's new technological manufacturing processes.

Conclusions and Recommendations

1. Project activities have helped vocational centers and comprehensive high schools in program planning, staff development, and equipment selection for the integration of new technology into their programs.
2. Project activities have improved communication and articulation between various educational institutions and promoted the regionalization concept of vocational education.

Recommendations

1. More effort will need to be placed in addressing the academic requirements of vocational students enrolled in specific technical programs.

Recommendations (continued)

2. A greater emphasis should be placed in expanding articulation activities with feeder districts and Community Colleges. Efforts will need to be made to develop a written articulation agreement with appropriate local institutions.

INSTRUCTIONAL EQUIPMENT LIST AND SPECIFICATIONS

LAKE COUNTY COMPUTER TECHNOLOGY CONSORTIUM
EDUCATIONAL BUY PROGRAM
INSTRUCTIONAL EQUIPMENT

July, 1984

The following equipment listed has been purchased through the state-sponsored Education Buy Program coordinated through the Lake County Computer Technology Consortium.

ITEM #	QTY	DESCRIPTION	VENDOR	MODEL #	TOTAL COST
MEDICAL ASSISTING - 19					
19-505	1	Apple IIe Professional System	Educ.Buy Prog.	Spec.	1,200.00
BUSINESS DATA PROCESSING - 24					
24-503	8	Apple IIe Professional System	Educ.Buy Prog.	Spec.	9,600.00
ELECTRONIC EQUIPMENT REPAIR - 35					
35-502	1	Apple IIe Professional System	Educ.Buy Prog.	Spec.	1,200.00
35-503	1	Apple Imagewriter printer	Educ.Buy Prog.	Spec.	486.50
COMPUTER ASSISTED DRAFTING - 52					
52-524	10	Apple IIe Professional System	Educ.Buy Prog.	Spec.	12,000.00
52-525	10	Super serial card	Educ.Buy Prog.	Spec.	973.00
		Section Total			$ 25,459.50
		GRAND TOTAL			$ 25,459.50

LAKE COUNTY AREA VOCATIONAL CENTER

ADVERTISEMENT FOR BID

The Lake County Area Vocational Center, 19525 West Washington Street, Grayslake, Illinois, 60030-1194, will receive bids until 1:30 p.m., prevailing time, on Monday, July 16, 1984, for movable instructional equipment pertaining to the following vocational program areas:

Auto Body, Auto Mechanics, Building Trades, Business Data Processing, Care & Guidance of Children, Commercial Food Service, Computer Assisted Drafting, Cosmetology, Electronic Equipment Repair, Graphic Communications, Health Care Assistant, Industrial Electrical Maintenance, Machine Shop, Media Specialist, Medical Assisting, Ornamental Horticulture, Secretarial Office Occupations, Small Engine & Recreational Vehicle Repair, Welding-Fabrication.

Lake County Area Vocational Center will publicly open and read bids immediately after specified closing time. (Bid opening: Room 101, Lake County Area Vocational Center, Grayslake, Illinois)

Bids shall be on the proposal form provided.

Obtain documents and specifications together with all necessary forms and other contract documents at the following address:

Lake County Area Vocational Center
19525 West Washington Street
Grayslake, Illinois 60030-1194 (owner)

312/223-6681

Mervyn C. Pilotte, Director
Lake County Area Vocational Center

June 20, 1984

INSTRUCTIONS TO BIDDERS

INSTRUCTIONAL EQUIPMENT BID

INSTRUCTIONS

Each set of Specifications contains Specifications, Features and Proposal Forms.

Bidders shall insert all prices as indicated. Omissions or additions must be explained in a separate exception listing. Equipment delivery must be made within thirty (30) days after bid award. Since the Lake County Area Vocational Center is a not-for-profit institution, it is tax exempt. Prices quoted on said bid shall not include taxes.

Completed bids shall be returned to the Lake County Area Vocational Center, 19525 West Washington Street, Grayslake, Illinois, 60030-1194. Proposals returned should be designated by "Equipment Bid 7-84" written clearly on the return envelope containing such proposal.

All bids received by the Lake County Area Vocational Center will be time-stamped upon arrival and all bids received after the designated time and date for opening will be returned unopened to the bidder.

BID AWARD

The award will be based on the responsible bidder whose equipment most nearly satisfies the overall specifications at the lowest aggregate cost. The LCAVC reserves the right to determine whether a bidder is responsible and has the ability and resources to perform the contract in full and comply with the specifications. The LCAVC further reserves the right to request additional information from the bidder to satisfy any responsibility requirements. The LCAVC also reserves the right to accept or reject any or all bids submitted and the further right to reject all bids and resubmit an invitation for new bids.

SPECIFICATIONS

One set of specifications is provided with this invitation. The bidder shall complete it in accordance with the Instructions to Bidders and the requirements detailed in the specifications. Bidders shall be responsible for the actual delivery of bids during business hours to the address indicated. IT SHALL NOT BE SUFFICIENT TO SHOW THAT THE BID WAS MAILED IN TIME TO BE RECEIVED BEFORE SCHEDULED CLOSING TIME FOR RECEIPT OF BIDS. BIDS MUST BE RECEIVED BY THE DESIGNATED TIME.

Any bidder may withdraw or modify his bid at any time prior to the scheduled closing time for receipt of bids. However, only telegrams, letters, or other written requests for modifications or corrections of previously submitted bid which are addressed in the same manner as the bid, and are received by the LCAVC prior to the scheduled closing time for receipt of bids, will be accepted. The bid, when opened, will then be corrected in accordance with such written requests, provided that the written request is contained in a sealed envelope which is plainly marked "Modification of Bid for the LCAVC." Oral or telephonic modifications or corrections of bids cannot be submitted after the closing time for receipt of bids.

Award will be made only in the event that all requirements contained in the Request for Proposal are satisfactorily complied with by the bidder. The LCAVC reserves the right to modify the terms and requirements outlined in this proposal prior to award if it is deemed to the LCAVC's advantage to do so. A contract negotiation stage may follow initial selection of the bidder who most nearly satisfies the LCAVC requirements. Upon request, bidders will be notified of the selection of the successful bidder.

TERMS AND CONDITIONS OF SALE

INSTRUCTIONAL EQUIPMENT BID

1. ENTIRE AGREEMENT - These Terms and Conditions together with the Invitation to Bid and such other sheets or documents as are made a part hereof, shall constitute the entire present agreement between the parties.

2. MODIFICATION - No change in, addition to or waiver of the terms, conditions and specifications contained herein shall be binding obligations of the LCAVC, unless approved in writing by the LCAVC.

3. TITLE AND RISK OF LOSS - Title to the goods herein described shall not pass until said goods have actually been received by the LCAVC. Risk or loss prior to such actual receipt by the LCAVC shall be borne by SELLER.

4. PAYMENT AND PRICE - Payment of the LCAVC for goods supplied hereunder shall not constitute acceptance thereof if subsequent inspection discloses failure to meet the specifications contained herein. In no event shall the LCAVC receive the benefit of any general reduction in SELLER'S prices prior to delivery, and in no event shall the LCAVC be charged a higher price than charged to SELLER'S other customers for goods of like grade and quality and in substantially the same quantities.

   Payment for awarded equipment will be made by Lake County Area Vocational Center after August 16, 1984 and after equipment has been delivered.

5. DELIVERIES - Time is of the essence. Deliveries shall be made to the Lake County Area Vocational Center on or before August 16, 1984. Shipping or transportation charges must be prepaid and included in the Bid price.

6. The successful bidder under contract shall provide printed material describing all components of equipment furnished, including but not limited to, maintenance manuals, operating manuals, and schematic drawings, and shall provide inservice training on equipment requiring the same.

7. REJECTION AND CANCELLATION - The LCAVC reserves its right to reject any goods and to cancel all or any part of this sale if SELLER fails to deliver all or any part of the goods described in the Invitation to Bid in accordance with the terms, conditions and specifications contained herein. Acceptance of any part of the goods covered by the Invitation to Bid shall not obligate the LCAVC to accept future shipments nor deprive it of its rights to revoke operations in the ordinary course of business (including inability to meet its obligations as they mature) or if any proceeding under bankruptcy or insolvency laws is brought by or against SELLER, or assignment for the benefits or credits is made by SELLER, the LCAVC may cancel this order without liability except for deliveries previously made or for goods covered by the Invitation to Bid then completed and subsequently delivered in accordance with the terms, conditions and specifications contained herein.

8. WAIVERS - The LCAVC's waiver of any breach or failure to enforce any of the terms, conditions and specifications of Invitation to Bid shall not in any way affect, limit or waive PURCHASER'S right thereafter to enforce and compel strict compliance with every term, condition and specification hereof.

9. WARRANTIES - SELLER makes the following warranties to the LCAVC of the goods herein described: (a) It will, at the date of delivery, have good title to any and all goods supplied hereunder, and said goods will be new and free and clear of any and all liens and encumbrances, (b) Any and all goods supplied hereunder will be of merchantable quality, and will be guaranteed for one year from date of delivery for workmanship and proper operation, (c) Any and all goods supplied hereunder will be fit for the particular use intended and will be in full conformity with the specifications contained herein. SELLER agrees that the foregoing warranties shall be in addition to any warranties of additional scope given to the LCAVC.

10. PATENT INFRINGEMENT - SELLER agrees to indemnity and hold harmless the LCAVC of the goods herein described against any and all loss, damage or injury arising out of a claim or suit for alleged infringement of any letters patent granted by the United States or anyforeign government relating to the goods herein described. SELLER agrees that it will assume the defense of any and all such suits and pay all costs and expenses incidental thereto.

11. APPLICABLE LAWS - SELLER represents and agrees that the goods herein described have not been or will not be manufactured, sold, priced, or transported in violation of any federal, state or local law or any lawful order, rule or regulation issued thereunder.

12. GOVERNING LAW AND ASSIGNMENTS - The contract formed pursuant to the terms, conditions and specifications herein and the obligation thereby imposed on SELLER and the LCAVC shall be governed by and construed according to the laws of the State of Illinois. SELLER shall not assign such contract without the written consent of the LCAVC.

13. EQUIPMENT BID DEVIATIONS - All equipment bids not meeting specifications as contained in the bids must be identified and such deviations must be clearly listed on the proposal form and the word ALTERNATE placed adjacent to that unit of equipment. Appropriate information and literature relative to an alternate bid must be included and attached to the proposal form. Failure to identify equipment deviation of the proposal form will be justification for bid rejection.

LAKE COUNTY AREA VOCATIONAL CENTER

HIGHLIGHTS OF BIDDING DOCUMENTS:

F.O.B.	ALL BIDS MUST BE BASED ON FOB, LAKE COUNTY AREA VOCATIONAL CENTER, 19525 WEST WASHINGTON STREET, GRAYSLAKE, ILLINOIS, 60030-1194.
SPECIFICATIONS:	ALL BIDS MUST BE MADE ACCORDING TO SPECIFICATIONS, ATTACHED TO THIS PROPOSAL. MANY ITEMS SPECIFY ITEMS INCLUDED, SUCH AS SETS, CASES, INSTRUCTIONS, TOOLS, PARTS, ETC.
SUBSTITUTIONS	IF SUBSTITUTIONS ARE MADE, YOU MUST STATE YOUR INTENTIONS, AND ENCLOSE DETAILED DESCRIPTIONS OF ITEMS SUBSTITUTED.
BID DEVIATIONS	ALL EQUIPMENT BIDS NOT MEETING SPECIFICATIONS AS CONTAINED IN THE BIDS MUST BE IDENTIFIED, AND THE DEVIATIONS MUST BE IDENTIFIED, AND SUCH DEVIATIONS MUST BE CLEARLY LISTED ON THE PROPOSAL FORM. (FAILURE TO LIST DEVIATIONS WILL JUSTIFY BID REJECTION.)
ITEM NUMBER	THE KEY IDENTIFICATION OF ALL EQUIPMENT IS OUR ITEM NUMBER. PLEASE REFER TO OUR ITEM NUMBER IN ALL FUTURE CORRESPONDENCE.
GUARANTY	ALL ITEMS SOLD MUST BE GUARANTEED FOR ONE YEAR FROM DATE OF DELIVERY COVERING WORKMANSHIP & PERFORMANCE OR OTHERWISE STATED.
DATE OF AWARD	PURCHASE ORDERS WILL BE MAILED TO THE AWARDED BIDDER ON JULY 27, 1984, AFTER BOARD APPROVAL.
INVOICES	ALL INVOICES FOR THE PURCHASE OF INSTRUCTIONAL EQUIPMENT WILL BE SUBMITTED IN THE SAME TERMINOLOGY AS LISTED ON THE BID SPECIFICATIONS.
PAYMENT	PAYMENT FOR AWARDED EQUIPMENT WILL BE MADE BY LCAVC AFTER AUGUST 16, 1984.
DELIVERY	DELIVERY IS EXPECTED THIRTY (30) DAYS AFTER BIDS HAVE BEEN AWARDED (JULY 27, 1984) AND PURCHASE ORDERS HAVE BEEN PLACED. ANY EXCEPTION TO THIS DATE MUST BE STATED AT THE TIME THE BID IS SUBMITTED.
EXEMPTION OF SALES TAX	THE LAKE COUNTY AREA VOCATIONAL CENTER IS A RECOGNIZED PUBLIC EDUCATIONAL INSTITUTION AND EXEMPT FROM ALL SALES TAXES.
GENERAL TERMS INSTRUCTIONS	PLEASE REFER TO BID DOCUMENTS INCLUDED IN BID PACKAGE.

INDUSTRIAL ELECTRICAL MAINTENANCE

Equipment

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
500	2	Pneumatics trainer Console: 24"x30" 16 gauge steel air supply connection filter, regulator regulated air supply & gauge test station gauge 0-100 psi work surface board component storage board 12-16 volt power supply fuse assembly Hardware components: 1 - component mounting board 14 - pneumatic input switches 14 - pneumatic input indicators 14 - pneumatic output outlets 14 - pneumatic output indicators 4 - electrical 12-16V AC input switches 4 - electrical input indicator lights 4 - electrical output terminals 4 - electrical output indicator lights 1 - electrical power on-off switch & indicator 2 - in-line flow controls 2 - Venturi components 1 - 1-1/8" bore, 1" stroke spring return cylinder 1 - 7/8" bore, 1" stroke double action cylinder Amptronics Model Brat 500 No substitute			
		Model #	____________		
		TOTAL		____________	____________
34-501	1	Robot conveyor module Conveyors: 4"w, 24"l, 4.025"h - 2 ea Brackets: 32"l, 5.125"w, .500 thick - 2 ea Controller: variable speed control cube - 1 ea Operating voltage: 120 VAC, 50/60 Hz Includes a 3-pronged grounded line cord that interfaces with the Brat 801, but can be powered from any 120VAC outlet. Includes user's manual Amptronics Model Brat 802 No substitute			
		Model #	____________		
		TOTAL		____________	____________

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
34-502	2	Pneumatic robotic arm trainer			

4 axes

Hardware components:
7 - manifolds
1 - lever operated, 2 position valve
1 - lever operated, spring return, 3 position valve
1 - single solenoid, spring return, 2 position in pilot valve
1 - double solenoid, spring centering, 3 position in pilot valve
1 - double air piloted, 2 position, 2 detent valve
1 - double air piloted, spring centering, 3 position valve
1 - blank manifold cover
1 - rotary actuator (rack & pinion)
1 - rotary actuator (single vane)
2 - tee fitting (adjustable)
4 - adjustable L fitting
5 - variable fitting
15 - fast connect fittings
10 - spare barb fittings
1 - fitting & hose storage box
1 - air supply connection
1 - filter
1 - regulator
1 - pressure gauge
1 - regulated pressure station (isolated)
1 - quick exhaust
5 - adaptors, 1/8 NPT to 10-32
1 - valve repair

Amptronics Model Brat 501
No substitute

Model # ____________

TOTAL ____________ ____________

COMPUTER ASSISTED DRAFTING

Equipment

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
[illegible]00	10	Microcomputer work table 30" x 60" x 26½" Golden oak woodgrain laminate with putty color enamel, rubber cushioned steel glides, with modesty panel Virco Model 81305 or equivalent			
		Model #	________		
		TOTAL		________	________
52-501	20	Student swivel chair Seat: 17"w x 17"d x 1½" thick Back: 15"w x 10"h x 3/4" thick Pneumatic seat height adjustment from 17½" to 22½" Separate backrest adjustment 4" height range Upholstered in 100% nylon - brown Five leg, steel base covered in dark brown plastic Hooded 2" dia. dual wheel casters Alpha Swivel Chair Model UC-A1-A-BN or equivalent			
		Model #	________		
		TOTAL		________	________
52-502	1	Teacher's desk Top: 30" x 60" High density solid core textured laminated plastic with plastic backing sheet and a T-mold bonded edge, full modesty panel with a center drawer with pencil tray. Legs: chrome plated tubular welded to a steel plate and brace Virco Model 574 or equivalent			
		Model #	________		
		TOTAL		________	________

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
52-503	2	File cabinet, letter size			

4 drawer, letter size with lock
Color: tropic sand

HON Model HN 314P-K
or equivalent

Model # ____________

TOTAL ____________ ____________

52-504	1	File cabinet, legal size			

4 drawer, legal size with lock
Color: tropic sand

HON Model HN 314CPK
or equivalent

Model # ____________

TOTAL ____________ ____________

SECTION TOTAL ____________
(52-500 thru 52-504)

52-505	10	Cadapple software station			

A. The operating system shall provide the following capabilities:
   1. File system
   2. System commands
      a. Merge graphics, files, delete files, automatic sequencing of files
      b. Additional development of languages Basic, Pascal, Fortran
   3. Text editor
   4. Additional capabilities
      a. Automatic backup of drawings
      b. Crash recovery of software
      c. Complete error message system
      d. Generate additional graphic symbols
      e. Provision of a command editor & processor
      f. User friendly functions
      g. Independent work stations
   5. System security control
   6. Utilizes Apple II & IIe hardware with 64K memory

B. Software will contain all of the following functions and features:
   1. Input options
   2. Primitive objects
   3. Text input
   4. Graphics display
   5. Symbol libraries
   6. System consideration
      a. Manipulate 4.000 objects in workfile

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
-505 (continued)		7. Storage capabilities 8. Output options 9. Speaks relative to types of drawings a. Piping & instrumentation schematics b. Piping plans c. Electrical wiring diagrams d. Electronic schematic diagrams e. Structural drawings f. Architectural g. Mapping h. Surveying i. Mechanical engineering Manufacturer: T&W Systems (CAD APPLE Software) or equivalent	Model # ________		
			TOTAL	________	________
52-506	1	C. Integration service including setup, delivery & inservicing Installation involves procurement, testing, setting up and configuring all parts of the systems. This means all the end user need do is to turn the unit on and it will be fully functional. This service includes the installation of all cards, chips and cables. It also includes copying all software. Installation also means delivering the system on site. Phone and on site support is provided for 90 days and may be extended through agreement of the purchaser and installer.	Model # ________		
			TOTAL	________	________
52-507	1	One-year software update	Model # ________		
			TOTAL	________	________
52-508	10	Pad digitizer 11" x 11" digitizer enables conversion of two-dimensional figures to vectors for computer storage HIPAD Model DT 11	Model # ________		
			TOTAL	________	________

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
52-509	10	System saver power protector Kensington Mfg.			
		Model #			
		TOTAL			
52-510	10	Mill speedup cord Pascal interpreter			
		Model #			
		TOTAL			
52-511	10	Zenith monitor 12" monochromatic video monitor Green screen - 25 lines of up to 80 characters in length Zenith Model ZVM 122 No substitute			
		Model #			
		TOTAL			
52-512	10	Smarttern card To split screen			
		Model #			
		TOTAL			
52-513	20	CAD Tutor software			
		Model #			
		TOTAL			
				SECTION TOTAL (52-505 thru 52-513)	
52-514	1	DMP 42 plotter 24" x 36" C/D sized single pen plotter with pedestal step size of 0.005" Houston Instrument Model DMP HZ plotter			
		Model #			
		TOTAL			

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
15	1	DMP 40 plotter 11" x 17" A/B sized, single pen 0.005" step size Houston Instrument Model DMP 40 plotter			
		Model #	____________		
		TOTAL		____________	____________
52-516	1	DMP 29 plotter 11" x 17" A/B sized eight pen flat bed plotter. Can operate in digitizer, made to report pen coordinates to host computer Houston Instrument Model DMP 29 plotter			
		Model #	____________		
		TOTAL		____________	____________
52-517	3	Plotter cables Plotter to microcomputer			
		Model #	____________		
		TOTAL		____________	____________
				SECTION TOTAL (52-514 thru 52-517)	____________

ALTERNATE BID: (Versa CAD)

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
52-518	10	Megaplus cord with 2 serial parts & 192K			
		Model #	____________		
		TOTAL		____________	____________
52-519	10	Versa Cad digitizer with stylus			
		Model #	____________		
		TOTAL		____________	____________
52-520	10	Versa Cad software			
		Model #	____________		
		TOTAL		____________	____________

ITEM #	QTY.	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
[illegible]21	1	Integration service, setup and delivery			
		Model #	________		
		TOTAL		________	________
52-522	1	One-year software update			
		Model #	________		
		TOTAL		________	________
52-523	10	8087 numeric speedup chip			
		Model #	________		
		TOTAL		________	________
				SECTION TOTAL (52-518 thru 52-523)	________

TABLE OF CONTENTS

(Instructional Equipment to be Purchased)

Machine Shop

a. CNC Lathe for training purposes 73-401

b. CNC Vertical Mill for training purposes 73-414

Item	Qty	Description	Mfg. & Model No.	Unit Cost	Total Cost
73-401	1	Computer Numeric Controlled Lathe for Training Purposes			

Compact 5 CNC Base Machine (w/160 block memory, absolute/incremental, feed per min./rev, and expanded software)

Includes: machine bed, headstock, chipguard, variable speed DC spindle drive, stepper motor/ball-screw axis drives, CNC control unit, digital mini-cassette tape deck with one tape, and quick-change toolpost with one standard toolholder.

Basic Machine includes: Machine bed, headstock, tailstock, longitudinal and cross slide, quick-change tool post with standard toolholder, chip tray, chip guard, CNC control unit, inch/metric programming, DC main drive motor, step motors and ball screws for longitudinal and cross movements.

LATHE TECHNICAL DATA

LATHE	
Swing-over bed	5.1"
Center height	2.56"
Distance between centers	12.2"
Swing over cross slide	2.4"
Travel of cross slide	1.9"
Net Weight	121 lbs.
HEADSTOCK	
Spindle bore	.63"
Spindle taper	MT2
TAILSTOCK	
Center sleeve diameter	.9"
Tailstock taper	MT1
Sleeve stroke	1.4"
FEED MOTORS	
Step motors	5°/step, 50Ncm
Rapid feed	28"/min.
MAIN SPINDLE DRIVE	
DC perm. magnet motor with six drive ratios	
Speed range	50-3200 RPM
Motor	2/3 hp

Motor overload protection. Automatic power balance provides practically constant speed.

CNC CONTROL TECHNICAL DATA

CONTROL UNIT

1. 160 program blocks
2. Feed range .04"-20"/min.
3. Rapid traverse 28"/min.
4. All tapers can be cut
5. Radius programming
6. Alarm indicates programming or operator error
7. Program modification possible
8. Incremental/Absolute programming
9. Magnetic mini-cassette tape reader
10. Inch and metric threads
11. Blocks can be deleted at later stage

PROGRAM SYSTEM

N = Block numbers 00-159
G = Preparatory command
  00 = Rapid traverse
  01 = Long. turning, facing and taper turning
  02 and 03 = Circular interpolation (spherical turning)
20 = Programmed stop
21 = No operation block
22 = Program end
23 = DNC interface
24 = Radius programming
25 = Tool offset
33 = Thread cutting
64 = Feed motors without current supply
65 = Magnetic tape reader
78 = Thread cutting cycle
84 = Turning cycle
90 = Absolute dimension/value programming
91 = Incremental dimension/value programming
92 = Programmed offset of reference point
94 = Feed in/min or mm/min
95 = Feed/rev
X and Y = Programmed long. and cross movements
F = Feed Rate

Emco Maier Compact 5 CNC or equivalent

Model # __________

TOTAL __________ __________

Accessories to Include:

73-402	1	Mechanical Plotter Kit - attaches to bed and quick-change toolpost for tracing programmed toolpath on paper.			

Includes: pen, penholder, roll paper, and plotter table

Model # __________

TOTAL __________ __________

BEST COPY AVAILABLE

Item	Qty	Description	Mfg. & Model No.	Unit Cost	Total Cost
73-403	1	Service Parts Set Includes: (2) V-belts, (1) timing belt, (4) felt wipers & (1) wiper plate			
		Model #	__________		
		TOTAL		________	________
73-404	1 set	Carbide Tooling 1 Tool setting gauge - metric 1 Tool setting gauge - inch 1 Right hand turning tool (uses indexable carbide inserts 260.610) 1 Left hand turning tool (uses indexable carbide inserts 260.610) 1 Straight turning tool (uses indexable carbide inserts 260.610) 2 Sets of 10 carbide indexable inserts 1 External threading tool (uses indexable carbide inserts 260.621) 1 Set of 5 carbide indexable inserts for external threading			
		Model #	__________		
		TOTAL		________	________
73-405	1	Drill Chuck - 5/16 capacity			
		Model #	__________		
		TOTAL		________	________
73-406	1	MT 1 Arbor for mounting drill to tailstock			
		Model #	__________		
		TOTAL		________	________
73-407	1	3-Jaw universal lathe chuck			
		Model #	__________		
		TOTAL		________	________

Item	Qty	Description	Mfg. & Model No.	Unit Cost	Total Cost
73-408	1	Clamping disc/face plate			
		Model #			
		TOTAL			
73-409	1	Triple bearing live center (workholding acc.)			
		Model #			
		TOTAL			
73-410	1	Std. O.D. toolholder (New style/ Quick Chg.)			
		Model #			
		TOTAL			
73-411	2	Digital mini-cassette tapes (spare)			
		Model #			
		TOTAL			
73-412	1 set	Instructional Courseware 6 Emco programming pads (100 sheets) 6 "Basis" Student Manuals 1 Instructor package Includes: "Instructor" manual with course outline, lesson plan, instructional notes, and "Vision" set of overhead transparencies			
		Model #			
		TOTAL			
		Alternate			
73-413	1	Video/Interface Package Includes: add-on circuit board, 12" high resolution green monitor, RS232C serial interface, 20mg current loop interface, connector cables, mounting hardware & instructions Emco Maier Compact 5 CNC or equivalent			
		Model #			
		TOTAL			

Item	Qty	Description	Mfg. & Model No.	Unit Cost	Total Cost
73-414	1	CNC Vertical Milling Machine for training purposes with control in 3 axes, to include the following features: Table size min. - 14"x6" Longitudinal travel min. - 7½" Transverse travel min. - 3-1/8" Vertical travel min. - 1½" Milling head swivel min. - 90° Spindle motor-DC min. - ⅓ HP Speed range min. - 500-2000 Programmable feed rates inch or metric programming	Model # __________		
		TOTAL		________	________
73-415	1 set	Basic tool accessories including: milling chuck, collets, milling cutters, drill/chuck, plastic hammer, machine vise, necessary tooling, including clamping devices required for operation	Model # __________		
		TOTAL		________	________
73-416	1	3 Axis CNC Programmer/Control System Program Capabilities Functions N, G, F, S, T, M N - Block numbers G - General prep functions F - Feed, speed S - Spindle speed T - Tool number M - Miscellaneous function Capability of circular interpolation, tool offset & radius compensation, drilling cycles	Model # __________		
		TOTAL		________	________

Item	Qty	Description	Mfg. & Model No.	Unit Cost	Total Cost
73-417	1 set	Student/Instructor instructional manuals including canned learning activities and programming accessories and Appropriate staff training on system	Model # ________		
		TOTAL		________	________
		Alternate			
73-418	1	CRT Programming Station with RS232 interface used to read and detect student programming faults	Model # ________		
		TOTAL		________	________

Following page on colored paper.

NOTE:

PLEASE RETURN ATTACHED PROPOSAL FORM UPON COMPLETION OF PRICE LISTINGS.

PROPOSAL FORM

PROPOSAL TO:	LAKE COUNTY AREA VOCATIONAL CENTER 19525 West Washington Street Grayslake, Illinois 60030-1194 MERVYN C. PILOTTE, DIRECTOR
PROPOSAL FOR:	LAKE COUNTY AREA VOCATIONAL CENTER GRAYSLAKE, ILLINOIS
PROPOSAL FOR:	MOVABLE INSTRUCTIONAL EQUIPMENT CONTRACT

By ____

(Bidder's Name)

A. BASE PROPOSAL:

Having carefully examined the Advertisement for Bids, Instructions to Bidders, Proposal Form, Terms and Conditions of Sale, and the specifications for the Lake County Area Vocational Center, Grayslake, Illinois dated February 24, 1984, and all addends thereto, and being familiar with all conditions including the availability of materials, equipment and labor;

The Undersigned, in submitting this bid, understands that the right is reserved by the owner to reject any or all bids. It is further agreed that this bid may not be withdrawn for a period of thirty (30) days from the opening thereof.

If base bid excludes any portion of the work as described in the specifications, such exclusion or deletion may be grounds for dismissal for the proposal. No bid will be considered if submitted on other than these proposal sheets.

If notice of the acceptance of this bid is given to the Undersigned within the valid period specified, or any time thereafter before the bid is withdrawn, the Undersigned will, within ten (10) days after the receipt of such notice, execute the Contract with the Owner.

Respectfully submitted,

____

____

____

By______________________________
Signature of Officer

(If a corporation, affix seal)

Title______________________________

Official Address______________________________

____

____

Date of Proposal____________________

PURCHASE ORDER

P.O. No. 00-542-888

LAKE COUNTY AREA VOCATIONAL CENTER
19525 W. WASHINGTON ST. GRAYSLAKE, IL 60030 (312) 223-6681

DATE OF ORDER 6/22/84
DATE REQUIRED asap
INSTRUCTIONAL AREA Taylor
ACCOUNT NO. 85-1400

SHIP TO
LCAVC
Attn: Richard Glogovsky

VENDOR
Education Buy Program
Apple Computer
5655 N. Meadowbrook
Rolling Meadows IL 60008

QUANTITY	CATALOG NO.	DESCRIPTION	UNIT PRICE	AMOUNT
20	A2P2032	Apple IIe Professional System, 64K	1,200.00	24,000.00
		includes: Dual Disk drive		
		Monitor II		
		Extended card w/64K		
		80 column card		
10	A2B0044	Super Serial Card	97.30	973.00
1	A2P2034	Apple Imagewriter printer, 10",	486.50	486.50
		includes: Accessory kit		
		Super Serial Card		
		TOTAL		25,459.50
		Plus shipping		
		Installing Dealer: Video Etc.		
		Attn: Terry Shevelenko		
		945 Lake Cook Plaza		
		Deerfield IL 60015		
		312/498-9669		

INSTRUCTIONS
1. P.O. Number must appear on all invoices, claims, packing slips, shipping labels and any correspondence.
2. Itemized packing list required in each carton.
3. If unable to ship, advise immediately.
4. Tax exempt No. 36-6509939.

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PURCHASING AGENT

The equal opportunity clause of the Illinois Fair Employment Practices Commission's Rules and Regulations for public contracts is hereby made a part of this purchase order.

EMPLOYER/EMPLOYEE SURVEY RESULTS

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: A. COMPUTER ASSISTED DESIGN & DRAFTING

Number of responses: 12

Willing to serve on advisory committee: 4

Types of Automated High Tech Equipment Utilized:

Intergraph CAD work station
Computervision drafting terminal
IBM graphics terminal
Applicon & CADAM
Hewlitt-Packard plotters
Tape drives & punches
Easy Cam (Bridgeport-Textron)
CRT graphics terminal
DEC 11/70 CPU

Recommended Competencies: (knowledge & skills required)

Mathematics:
Solid geometry
Descriptive geometry
Algebra/operations
Trigonometry
Numerical operations
Points & lines, planes, curved surfaces
Conics

Electricity/ Electronics:
Basic electronics
Electronic drafting symbols
Industrial electricity
DC & AC circuits

Applied Chemistry:

Applied Physics:
Basic physics
Mechanics, heat electricity, sound
Light

Applied Biology:

Computer Literacy:
Input & output devices
Devices & media for storage
CPU
Intro to D.P.
Familiar with computers
Basic programming
Understand different programs & languages
Terminology

Equipment Operation (skills):
Typing helpful
Computer terminal operation
Station input
Visualization & perception

Equipment Operation (knowledge):
Fundamentals of computer concepts
Awareness of ind. materials & practices
Typing helpful
Good drafting skills
Understanding of XYZ coordinates

Others:
Mfg. skills & methods (machine shop)
Understanding of: NC equip. dies, molds templates assembly
Basic geometrical constr.
Assemblies
Charts, graphs
NC programming
Engineering drawing
Orthographic projections
Auxiliary views
Dimensioning & graphic symbols
Blueprint reading
Freehand sketching

Recommended Instructional Equipment:

Computer terminals
CAD drafting equipment
Terak
Apple 2e
Pitsco
A size plotter (Hewlitt Packard)
Basic software
MATC, Micro-CAD
CAD Apple
Cascade

Desired Characteristics: (educ. degree)
a. H.S. graduate
b. 1-yr post H.S. cert.
c. Associate 2-yr degree

Drafting:
Piping
HVAC
Mech, elect., arch.

1/84

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: B. COMPUTER ASSISTED MANUFACTURING

Number of responses: 12

Willing to serve on advisory committee: 2

Types of Automated High Tech Equipment Utilized:

- CAD-CAM Systems
- N.C. equipment
- Hewlitt-Packard plotters, tape drives & punches

Recommended Competencies: (knowledge & skills required)

Mathematics:
- Technical math skills
- Geometry
- Trigonometry
- Algebra

Electricity/Electronics:
- Process control

Applied Chemistry:

Applied Physics:

Applied Biology:

Computer Literacy:
- Understanding of:
  - Computers
  - Software
  - BASIC language

Equipment Operation (skills):
- Typing
- Read measuring tools & blueprints
- Operate machinery

Equipment Operation (knowledge):

Others:

Typical job skills for drafting, design with NC programming

Understanding of:
- XYZ coordinate system
- Engineering drawing
- Orthographic projections
- Auxiliary views
- Dimensioning
- Logic & digital language

Understanding of mfg. methods:
- NC equipment
- Dies, molds
- Templates & assembly
- Report writing & communications

Recommended Instructional Equipment:

- Drafting equipment
- Microcomputer
- Typewriter
- Metal cutting equipment
- Digital readout
- Bridgeport-Textron Easy-Cam software program
- Simulated work units
  - a. Remco compact 5 CNC
  - b. Boxford ACL (auto control lathe)

Desired Characteristics: (educ. degree)

- a. H.S. graduate
- b. 1-yr post H.S. cert.
- c. Associate 2-yr degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: C. COMPUTER NUMERICAL CONTROL

Number of responses: 12

Willing to serve on advisory committee: ____________

Types of Automated High Tech Equipment Utilized:

Hobbing machines

CNC turning machines

CNC grinders

Cincinnati-Milicron:
- a. Step grinder
- b. OD grinder
- c. End mill

Bridgeport-Textron:
- a. Mill

Programmable controllers

Microprocessors

Computers

Recommended Competencies: (knowledge & skills required)

Mathematics:

Geometry

Trigonometry

Technical math:
- decimals
- fractions

Logic

Electricity/ Electronics:

Digital

Applied Chemistry:

Applied Physics:

Applied Biology:

Computer Literacy:

Basic computer programming

XYZ programming

Equipment Operation (skills):

Blueprint reading

Grinder knowledge

Basic machinery skills:
- drill
- turn
- mill
- grind

Equipment Operation (knowledge):

Basic machine shop skills

Machine tools

Others:

Programming skills

Languages, COBOL

CNC programming

Good use of measuring tools

Metallurgy & heat treating

Tool setup & shaping

Positive attitude

Marketing

Recommended Instructional Equipment:

CNC equipment simulators

Computer controls

Printer

tape punch & readers

CNC mill (Bridgeport/ Hurco)

Gen. Numeric programmer

Emco Compact 5 CNC

Boxford ACL lathe

Powermatic CNC mill

Terco CNC trainer (Technovate)

Desired Characteristics: (educ. degree)

a. H.S. graduate

b. 1-yr post H.S. cert.

c. Associate 2-yr degree with machine shop experience

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: D. MICROCOMPUTER/COMPUTER OPERATION & PROGRAMMING

Number of responses: 5

Willing to serve on advisory committee: 2

Types of Automated High Tech Equipment Utilized:

IBM-Mini
Apple IIe
Burroughs
Computer development systems

Recommended Competencies: (knowledge & skills required)

Mathematics:
Technical math
Algebra
Trigonometry
Geometry
Calculus

Electricity/ Electronics:
Basic understanding of electricity

Applied Chemistry:

Applied Physics:

Applied Biology:

Computer Literacy:
Good understanding of programming & computer operation
a. Basic
b. RPG
c. Cobol

Equipment Operation (skills):

Equipment Operation (knowledge):
Keyboarding skills
Programming skills

Others:
English
Communications
Letters & Reports
Good work habits
Flowcharting

Recommended Instructional Equipment:

Microcomputers, all types
a. TRS-80
b. Commodore
c. Apple
d. IBM

Dedicated systems with terminals
IBM
Burroughs

Desired Characteristics: (educ. degree)

a. H.S. graduate
b. 1-yr post H.S. degree
c. Associate 2-yr degree
d. Baccalaureate degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: E. MICROCOMPUTER TROUBLESHOOTING & REPAIR

Number of responses: 7

Willing to serve on advisory committee: 1

Types of Automated High Tech Equipment Utilized:

- Logic IC analyzer
- Logic probes
- Analytical instruments
- Data reduction systems
- Microcomputer & associated peripherals
- Electronic test equipment
- Telecommunications modems & terminals
- Oscilloscope & related test equipment

Recommended Competencies: (knowledge & skills required)

Mathematics:
- Algebra
- Hexidecimal
- Technical
- Computer numbering systems

Electricity/Electronics:
- High frequency oscilloscope
- Basic AC/DC theory
- Digital logic & schematics
- Understand logic patterns & devices
- Calculate frequency
- AC & DC circuits
- Microprocessors
- Telecommunications circuits
- Block diagrams

Applied Chemistry:

Applied Physics:
- Levers & gears

Applied Biology:

Computer Literacy:
- Basic computer theory
- One programming language
- Imput
- Basic Pascal

Equipment Operation (skills):
- Able to use & operate oscilloscope
- VOM, Fet VOM,
- Freq. gen. logic tester
- Use of electronic test equipment

Equipment Operation (knowledge):
- Understand calibration standards
- Typical peripheral operation
- Data flow through system

Others:
- Skilled in hand tool use
- Basic use of word processor
- Technical writing
- Building logical approaches to troubleshooting

Recommended Instructional Equipment:

- Digital trainer
- Microcomputer with multiple long compilers
- Heathkit trainers
- Bell & Howell trainers
- T.S.I. computer maintenance system ECI 89100
- Computer based teaching aids
- Microcomputer test lab

Desired Characteristics: (educ. degree)

a. H.S. graduate

c. Associate 2-yr degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: F. MICROELECTRONICS/TELECOMMUNICATIONS

Number of responses: 5

Willing to serve on advisory committee: ____________

Types of Automated High Tech Equipment Utilized:

Digital decoding

Recommended Competencies: (knowledge & skills required)

Mathematics: Balloon logic
Simple equations

Electricity/Electronics: AC/DC basic
elect. dist.

Applied Chemistry: ____________

Applied Physics: Basic motion, sound & vibration analysis

Applied Biology: ____________

Computer Literacy: Basic programming

Equipment Operation (skills):
Typing
All electrical test operations:
a. oscilloscope
b. signal generator

Equipment Operation (knowledge): Can operate test equipment

Others:
Communicative skills
Attitude

Recommended Instructional Equipment:

Microcomputers
Troubleshooting simulators
Digital trainers

Desired Characteristics: (educ. degree)

c. Associate 2-yr degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: G. ROBOTICS

Number of responses: 6

Willing to serve on advisory committee: 2

Types of Automated High Tech Equipment Utilized:

Amptronics - Brat
Lennox trainer
Cincinnati-Milacron
Machine vision systems
Lasers

Recommended Competencies: (knowledge & skills required)

Mathematics:
Technical math
Algebra
Boolean algebra

Electricity/Electronics:
Ohms law, Kirkoffs
AC impedence
Motor controls
Ladder diagrams
Electric circuit theory
Electronic components
Basic digital electronics

Applied Chemistry:
Understand:
oxidation
reduction
Semi-conductor theory

Applied Physics:
Understand:
hydraulics
pneumatics
physical laws
Basic Physics incl mass & acceleration theory
Mechanics

Applied Biology:

Computer Literacy:
Basic programming language

Equipment Operation (skills):
Basic robotic operation
Electrical & mechanical troubleshooting & repair skills

Equipment Operation (knowledge):
Equipment operation
Servo operation

Others:
Gripper design
Work task analysis
NC programming
Reading electrical schematics
Electrical circuitry
Motors & controls
Pneumatics & hydraulics
DC motor controls
Digital controls
Measuring instruments & quality control skills
Oxyacetylene & MIG welding skills

Recommended Instructional Equipment:

Amptronics robotic trainer
Lennox robotic trainer
Modular Developed robotic trainer (MDRT)
Teaching robot

Desired Characteristics: (educ. degree)

c. Associate 2-yr degree
d. Baccalaureate degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: H. FIBER OPTICS

Number of responses: 5

Willing to serve on advisory committee: 1

Types of Automated High Tech Equipment Utilized:

Laser measuring optics equipment

Robots

Machine vision systems

Lasers

Recommended Competencies: (knowledge & skills required)

Mathematics:
Geometry
Trigonometry
Read gauges & angles
Technical math

Electricity/Electronics:
Working knowledge of electricity
Technical knowledge of electrical circuits

Applied Chemistry:

Applied Physics:

Applied Biology: Working knowledge

Computer Literacy: Working knowledge of personal computer

Equipment Operation (skills): General knowledge:
grinder
lathe
mill

Equipment Operation (knowledge):

Others:
Blueprint reading
Report writing
Drafting
English

Recommended Instructional Equipment:

Quality control testing

Measuring tools:
caliper, etc.

Fiber optic systems

Desired Characteristics: (educ. degree)

a. H.S. graduate

d. Baccalaureate degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: I. LASER BEAM

Number of responses: 3

Willing to serve on advisory committee: 1

Types of Automated High Tech Equipment Utilized:

Numerical control table positioning & laser firing

Recommended Competencies: (knowledge & skills required)

Mathematics: Technical math
Geometry
Trigonometry

Electricity/Electronics: Basic terminology & understanding of basic meters
Electrical P.C. boards

Applied Chemistry: Basic chemistry skills, materials, elements

Applied Physics: Basic skills

Applied Biology:

Computer Literacy: Able to respond to user friendly programs

Equipment Operation (skills): Good mechanical skills
Equipment usage

Equipment Operation (knowledge): Teletype-able to enter instructions & data

Others: Mettalurgy
Calibration skills
Measuring tool skills

Recommended Instructional Equipment:

N.C. simulator
Variety of test equipment

Desired Characteristics: (educ. degree)

c. Associate 2-yr degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: J. MEDICAL TECHNOLOGY

Number of responses: 1

Willing to serve on advisory committee:

Types of Automated High Tech Equipment Utilized:

Analytical instruments

Computerized data reduction system

Recommended Competencies: (knowledge & skills required)

Mathematics:
Technical math
Algebra
Statistics
Trigonometry

Electricity/Electronics: Basic electronics

Applied Chemistry: General

Applied Physics: General

Applied Biology: General biology inc. physiology

Computer Literacy: Basic use

Equipment Operation (skills):

Equipment Operation (knowledge):

Others:

Recommended Instructional Equipment:

Basic experimental biology, chemistry, physics

Desired Characteristics: (educ. degree)

a. H.S. graduate
b. 1-yr post H.S. cert.
c. Associate 2-yr degree
d. Baccalaureate degree
e. Master's degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: K. PLASTICS TECHNOLOGY

Number of responses: 2

Willing to serve on advisory committee: 1

Types of Automated High Tech Equipment Utilized:

Robotics

Lasers

Computer imaging

Recommended Competencies: (knowledge & skills required)

Mathematics: Technical incl: multiplication division decimals percentages

Electricity/Electronics:

Applied Chemistry: Technical understanding of specific heat

Applied Physics: Technical understanding of simple stress strain

Applied Biology:

Computer Literacy: Use a simple microcomputer

Equipment Operation (skills): Be able to start up & shut down a plastic die machine

Equipment Operation (knowledge):

Others:

Recommended Instructional Equipment:

Small injection molding machine with microprocessor & robotic arm

Small extrusion blow molding machine

Desired Characteristics: (educ. degree)

High school grad

Associate degree

Baccalaureate degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: L. AUTOMATED WORD PROCESSING

Number of responses: 9

Willing to serve on advisory committee: 2

Types of Automated High Tech Equipment Utilized:

- Computergraphic typesetter
- Microcomputer with word processing programs
  - Wang
- Shared logic equipment

Recommended Competencies: (knowledge & skills required)

Mathematics:
- Addition
- Subtraction
- Decimals
- Computational
- Percentages

Electricity/ Electronics:

Applied Chemistry:

Applied Physics:

Applied Biology:

Computer Literacy:
- Programming skill in a word processing format
- Basic language understanding of programming

Equipment Operation (skills):
- Typing/keyboarding skills
- Changing ribbon & print wheels

Equipment Operation (knowledge):
- General knowledge of word processing

Others:
- English
- Good grammar & communicative skills
- Accurate spelling
- Punctuation
- Interpersonal relations
- Social skills
- Service skills

Recommended Instructional Equipment:

- Menu-driven equipment
- Lexitron word processing equipment
- A.B. Dick word processor terminal
- TRS-80 Micro
- Eagle Micro
- Wang
- MBI
- IBM
- Exxon
- DEC

Desired Characteristics: (educ. degree)

a. H.S. graduate

b. 1-yr post H.S. cert.

c. Associate 2-yr degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: M. HORTICULTURAL/AGRICULTURAL RESEARCH

Number of responses: 5

Willing to serve on advisory committee: 1

Types of Automated High Tech Equipment Utilized:

Microscope

Recommended Competencies: (knowledge & skills required)

Mathematics: Tech: a. multiplication
b. division
c. decimals
d. percentage
e. metric
Log. geometry,
computer skills,
algebra, statistics

Electricity/Electronics: Basic

Applied Chemistry: Technical elements
Molecular wt.

Applied Physics: Basic

Applied Biology: Microscope
ID of species
Technical anatomy
Environmental entomology

Computer Literacy: Tech
CAD/CAM

Equipment Operation (skills):

Equipment Operation (knowledge): Basic micro-computer

Others:

Recommended Instructional Equipment:

Microscope
Balances
Microcomputer
OH meters
Autoclaves

Desired Characteristics: (educ. degree)

c. Associate 2-yr degree
d. Baccalaureate degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: N. ENERGY CONSERVATION

Number of responses: 0

Willing to serve on advisory committee: ____

Types of Automated High Tech Equipment Utilized:

Recommended Competencies: (knowledge & skills required)

Mathematics:

Electricity/ Electronics:

Applied Chemistry:

Applied Physics:

Applied Biology:

Computer Literacy:

Equipment Operation (skills):

Equipment Operation (knowledge):

Others:

Recommended Instructional Equipment:

Desired Characteristics: (educ. degree)

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: O. Other: LAB TECHNOLOGY

Number of responses: 7

Willing to serve on advisory committee: 2

Types of Automated High Tech Equipment Utilized:

- Electronic microscope

Recommended Competencies: (knowledge & skills required)

Mathematics:
- Technical math
- Decimals
- Division
- Metric system
- Percentage
- Geometry

Electricity/ Electronics:
- Basic circuitry

Applied Chemistry:
- Tech-molecular wts.
- Elements

Applied Physics:
- Basic

Applied Biology:
- Tech
- Microbiology
- Entomology
- Human
- Environmental

Computer Literacy:
- Basic

Equipment Operation (skills):
- Basic micro-computer
- Microscope operation
- Balance

Equipment Operation (knowledge):
- Pipetting
- Weighing
- Making solutions
- Separation tasks
- Culturing cells

Others:
- Highly motivated
- Interested in anything scientific
- Versed in the use of microscope
- Electrophorus in gels
- Chromatography

Recommended Instructional Equipment:

- Advanced microscopes
- Basic computers
- Various lab test equipment

Desired Characteristics: (educ. degree)

- c. Associate 2-yr degree
- d. Baccalaureate degree
- e. Master's degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: O. Other: MICROPROCESSOR REPAIR

Number of responses: 6

Willing to serve on advisory committee:

Types of Automated High Tech Equipment Utilized:

Various microprocessors

Recommended Competencies: (knowledge & skills required)

Mathematics:
- Algebra
- Geometry
- Trigonometry

Electricity/Electronics:
- Advanced electronics

Applied Chemistry:

Applied Physics:
- Basic applied physics

Applied Biology:

Computer Literacy:
- Basic programming
- Fortran

Equipment Operation (skills):
- Oscilloscope
- Various electronic test equipment

Equipment Operation (knowledge):
- Ohms law
- Solid state electronics
- Transistors
- IC chips
- Various power supplies
- Printed circuit boards
- Reading schematics
- Troubleshooting skills

~~Others~~

Recommended Instructional Equipment:

- Oscilloscope
- Counter devices
- Electrical test instruments

Desired Characteristics: (educ. degree)

c. Associate 2-yr degree

d. Baccalaureate degree

COMPOSITE RESPONSES TO EMPLOYER/EMPLOYEE SURVEY FOR HIGH TECH PROJECT

High Tech Category: 0. Other: DIGITAL EQUIPMENT REPAIR (KEYBOARDS)

Number of responses: 1

Willing to serve on advisory committee:

Types of Automated High Tech Equipment Utilized:

Test fixture

Comparer

Digital test

Recommended Competencies: (knowledge & skills required)

Mathematics:
Technical math
Fractions
Basic algebra

Electricity/ Electronics:
Electronics math
Ohms law, power
Boolean algebra

Applied Chemistry:

Applied Physics:

Applied Biology:

Computer Literacy:

Equipment Operation (skills):

Equipment Operation (knowledge):

Others:

Recommended Instructional Equipment:

Desired Characteristics: (educ. degree)

PUBLICITY MATERIAL

NEWS/VOICE JULY 21, 1983

Three awarded

Grants for vocational center

Lake County Area Vocational Center has been awarded three grants from the Illinois State Board of Education, Department of Adult Vocational and Technical Educaton. Requests for grant proposals are solicited throughout the state and are awarded on a competitive basis.

According to Richard Glogovsky, assistant director of LCAVC, there is a possibility that the grants will be renewed for an additional two years or until the end of the 1985-86 school year.

THE FIRST GRANT approved deals with the planning and development of a high technology program at the secondary level. During the 1983-84 school year, a High Tech Consortium will be developed to plan and develop alternatives by which vocational education programs can be designed to prepare students to enter high technology programs at the community college level. —

According to Glogovsky, "The high tech program planning/development project will become a vehicle which can be used to help vocational centers and compehensive high schools in program planning, staff development, and equipment selection for advanced technology training at the community college level. This project will identify the various methods used in the planning, development and implementation of high tech programs at the secondary level. Information and results will be helpful to community colleges and universities in developing sequential training paths and proper teacher preparation skills." Project funds total $40,000.

THE SECOND GRANT will bring the Illinois Competency Based Vocational Educational Project to Lake County. It has been in existance for five years and has been housed at the DuPage Area Vocational Education Authority in Addison. Competency based vocational education will be infused throughout all levels of vocational education training in Illinois as a result of this Project. As a result, new teachers will be better trained; students of high schools, area vocational centers, and community colleges will be better prepared for employment; the curricula will be more up-to-date; and teachers will be better able to meet the interests, needs and abilities of students. Project funding will cover administrative costs, consultants; and dissemination activities along with curriculum development funds. The project is for $250,000.

The third grant will deal specifically with support services to help disadvantaged, handicapped and limited-English proficient students successfully complete vocational education programs. Grant monies received will be in lieu of and addition to LCAVC handicapped and disadvantaged state reimbursement.

LCAVC program to expand

Lake County Area Vocational Center will have an "in-house" cosmetology program during the 1983-84 school year, instead of contracting with beauty schools, as it does now. LCAVC also will add a computer-assisted drafting and design course next year.

The LCAVC Board of Control Friday approved the in-house cosmetology program, which will be located in what is now the center's 4,800-square-foot vocational assessment laboratory. The vocational center is located just west of the College of Lake County Grayslake campus.

The vocational assessment laboratory has more space now than it needs, according to vocational coordinator Ardis Harnagel, and will be relocated during the March spring break to the area formerly occupied by the environmental control program. The environmental program was dropped a year and a half ago because of lack of interest, she said.

Once that lab is relocated, the renovation work can begin, probably about the first of April. Aug. 30 is the intended opening date, Harnagel said.

The main reasons for wanting the in-house program was to give uniformity to the program and to have more control of the students, she said.

High school students in the LCAVC's two-year cosmetology program now attend classes at Mueller's in Waukegan, the Arlington Academy in Arlington Heights, Waukegan School of Cosmetology, Don Roberts Beauty School in McHenry and the Geneva Academy in Lake Geneva, Wis.

LCAVC's change will not affect students who are enrolled in Waukegan High School's cosmetology program, which will continue to maintain separate contracts, Harnagel said. That program preceeded the one at LCAVC.

Also, she said senior students who are in the first year of the LCAVC program would not be moving to the center as they would be full-time students.

Currently, there are 134 first- and second-year cosmetology students. The 1,500-hour, in-house program will limit enrollment to 120 students, Harnegel said, but she added that there was often a big enrollment falloff between the first and second year.

The center will be working with area high schools to be more strict in advising students who enter the program to avoid that falloff, she said.

The LCAVC staff and the cosmetology advisory committee are expected to meet soon to complete plans for the program. Blueprints will be ready by the end of this week and will need approval by the Illinois Department of Registration and Education.

The board also gave tentative approval to a computer-assisted drafting and design (CADD) course. Final approval will be based on student enrollment for the program.

Harnagel said LCAVC did a student survey of drafting and pre-engineering students that indicated a desire for the program.

For final approval, LCAVC would need at least 30 students in two class sessions to justify purchase of the equipment, she said.

The program would be offered beginning in the second semester of the 1983-84 year. Although the program will be offered through LCAVC, it will be held at the College of Lake County.

The college is also going into CADD, so the vocational center will purchase equipment for beginning CADD, and the college will buy more advanced equipment.

Technology changing school curricula

Continued from Page 12

Today, however, most high school and college students are [illegible] fingers on a computer terminal; classes in data processing and basic computers are filled and often have waiting lists.

And the interest in computers has filtered into the lower grades, too, and many elementary districts are trying to buy computers for their students.

Unfortunately, purchasing the new equipment is generally expensive and the new changes come at a time when schools are being financially squeezed. In many cases, the schools have to purchase all new equipment — an expensive proposition to keep updated.

School officials, though, say the courses for "high-tech" careers — such as engineering technician, computer programming and repairing, computer-assisted design and manufacturing and word processing — are developing, though a little slowly.

Though the "high tech" revolution relies quite heavily on computers and sophisticated equipment to do work that was once done by laborers, skilled workers are required to program, operate and repair the machines.

That is the challenge facing the schools.

And that duty is causing changes at all levels of education, from the time when a students is old enough to understand the rudiments of addition through the day he opens his first algebra book.

The biggest challenge of preparing students for these new jobs is faced by the vocational schools and community colleges. More than any others, it is their duty to keep up with the changes in technology.

"High technology is the current buzzword of education — and it's a lot more than just a buzzword," said Merv Pilotte, director of the Lake County Area Vocational Center in Grayslake.

LCAVC, which has been operating for five years, offers 51 vocational programs to 1,500 high school students in Lake and McHenry counties, and also offers training to more than 1,800 adult students in night classes.

"High technology is something we are seeking for Lake County and Illinois. We are losing heavy industry to the Sun Belt state, so our survival is contingent on attracting high technology into Lake County," he said.

"There will be a shift to service industries the next 10 years and we'll see a surge in some employment needs such as electronics, computer programming, robotics and computer assisted drafting and manufacturing."

And more sophisticated technology is moving into almost all areas taught at LCAVC, such as air conditioning/refridgeration, medical assistance, horticulture and auto mechanics, he said.

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High tech education

Schools looking at the future

BY GALEN MEYER
Staff Writer

High technology is forcing a number of revolutionary changes in education, just as it is in the business world.

Keeping up with the continuing changes of "high tech" is hard on the businesses which use the technology, but it is perhaps even harder on the schools trying to educate students for those newly-developing careers.

The schools are being forced to adjust their programs, equipment and curricula to adapt to a field which has become the buzzword of business and education.

Quite often, the new technology did not exist until one or two years ago.

Just five years ago, a high school was lucky to have a small micro-computer — and that was used by only a few interested students.

Turn to Page 13

Photos by Galen Meye

Left, Lake County Area Vocational Center teacher Ray Snider demonstrates capacitor charging to Ola Offerman (left) of Wauconda High School and Davi Ori of Deerfield High School. Above, Snider show Vaughn Gibson of North Chicago High School how t assemble a binary up-counter.

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Schools

Continued from Page 13

Probably the biggest barrier keeping schools from really moving into high tech teaching is the cost — much of it is new, sophisticated and expensive.

It is much easier for the vocational school to keep up with technology than the regular high schools, Pilotte said, because the cost of equipment purchased by LCAVC is split with the state.

As an incentive to keep current, the state will pay for 60 percent of the costs incurred when buying new equipment. CLC and LCAVC have also been cooperating on splitting the costs for equipment.

But the high schools have to bear the brunt of most of the costs.

"High technology is a very expensive proposition," said Hodgson. "The question that has has really come to the fore is whether we can keep up with it. We may order a piece of equipment and it may be out of date by the time we get it. We have to be very cautious."

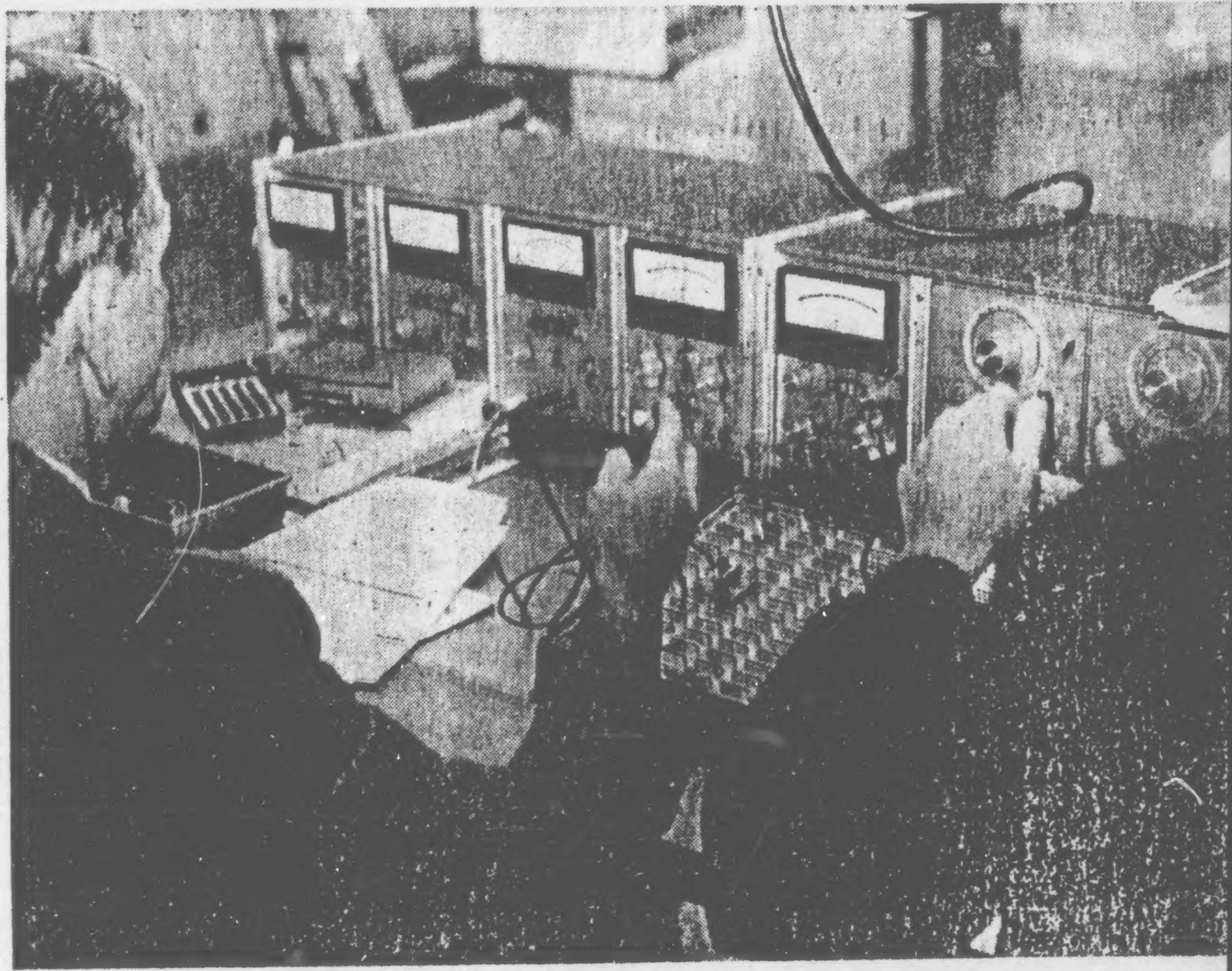
But the schools have to keep up with the technology if they are to give their students a chance in the working world. "There is going to be a demand in computers and high tech," Hodgson said. "More so than unskilled workers or even middle-level managers."

That responsibility also extends to the adults in the community. Most of the students at CLC are older-aged students, Springer said. More adults take courses at LCAVC than regular high school students.

"We have a responsibility not only to the students but also with adults so they can have job opportunity," Pilotte said.

In fact, most of the students interested in taking the more advanced high tech classes are adults, Springer said, because they have been in the field and know what is is developing.

Most often, they are getting retrained in their current fields, he said.



LCAVC teacher Ray Snider shows a student how to use the meters and electronic scopes to determine if he has correctly assembled his assignment. The school gives its student the rudiments of electronics.

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Pilotte has seen a big move this year toward high tech training. "A lot of impetus has been generated at the state and local level," he said. "We're moving into an area that is going to be very important."

At the College of Lake County in Grayslake, the process of change toward teaching necessary sophisticated skills "is an ongoing one," said Steve Springer, the director of career program development.

"We have a bigger committment in this area and we want to keep up with what is going on," he said. "The new technology is changing and will continue to change the way that we live."

The two-year community college, with almost 12,000 students, is gradually making changes in its curriculum, incorporating the new technology into existing programs, he said.

Computers, for example, have been worked into almost all of the programs offered at the college, from the sciences of accounting and engineering to the humanities of philosophy and art.

The school's curriculum is being changed, though, to adapt to the needs of students hoping to find jobs in the new fields.

Computer assisted design, where a draftsman "draws" an object on a computer screen, has become a new area of instruction at CLC — as has the new field of robotics.

The problem with setting up a curriculum for such areas, Springer said, is that they cut across a wide number of disciplines. A robotic technician, for example, has to have a thorough knowledge of pneumatics, electronics, metalworking, hydraulics and computer programming.

"We are looking at the interdisciplinary approach, where the student needs more than a single skill," Pilotte said.

The new technology also requires more of a basic, practical education for the students. Libertyville and Mundelein high schools are among those examining their curricula to update it.

"Entering into this age is causing us to look at our programs in depth so we can see what needs to be added on to," said Libertyville High School Principal Walter Hornberger.

Mundelein High School is also looking at further changes in its curricula, Principal Marilyn Howell said. Two years ago, the School Board increased the requirements for the hours of math a student had to take.

"The old approach is changing drastically," Pilotte said. "Vocational training was once thought of a dumping ground for those who couldn't make it elsewhere. Students have to have more math and applied mathematics because of the complexity of the occupations."

Perhaps the biggest move toward basic high technological training in the regular classroom is the expanded use of microcomputers.

The computer may have once been limited for use in the math or science departments, but has recently made inroads into the business, special education and other departments.

Howell said the school is considered considering changes that would make every student who starts high school in 1984 proficient in computer literacy.

But before the students can be taught the new technology, the teachers have to be well versed themselves. Teachers are literally going back to the classroom to learn how to use computers for teaching.

One-third of the 90 staff members at MHS recently showed an interest in taking a course on computers. "Teachers are interested because it is the wave of the future," Howell said.

"We are not using computers to replace teachers — no canned program can do that," Hornberger said. "But teachers are using computers to answer problems."

The vocational teachers at the high schools and LCAVC are also attending many classes and seminars on high technology fields.

"We spend a lot of time going to seminars and talks," said Gary Hodgson, director of the vocational department at LHS. "Before we get any new equipment, we have to teach everyone how to use it."

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BUSINESS and REAL ESTATE

Educators Look At High Technology

"Our country desperately requires a bold new approach to human resources commitment and development. That new approach must be equivalent to the commitment that landed a man on the moon," said Leonard Abrahamson.

"The 'moon-shot' for the 1980's must be aimed at the triple goals of high employment, increased productivity and economic health for the individual and our country."

"We must rise above the way we've done things in the past, in the search for new approaches and new combinations of resources consisting of a coherent, systematic national framework to achieve these goals," he continued.

"Together, industry and educational institutions must find a way to satisfy the needs for the skills that will be required, and in the numbers that will be demanded," he added.

ABRAHAMSON, vice president for corporate planning at Dynascan Corp., Chicago, set the tone for a conference of business people and educators at the College of Lake County (CLC).

The conference, titled "High Technology in the 1980's: Implications for Education in Lake County," brought Lake County educators to hear the future educational needs of business and industry from four prominent area business people.

CLC President John Hunter opened the conference by explaining, "Usually when educators get together at a conference, educators talk to educators. That is sometimes self-defeating because we already know what we're going to say to each other. Today's theme is a little bit different."

"We have asked four industrial leaders to tell us, the educators, what they think educational institutions should be doing; what directions we should be moving in; trends that we must take into consideration if we are indeed to remain relevant and provide some stimulus for our planning and curriculum development," he added.

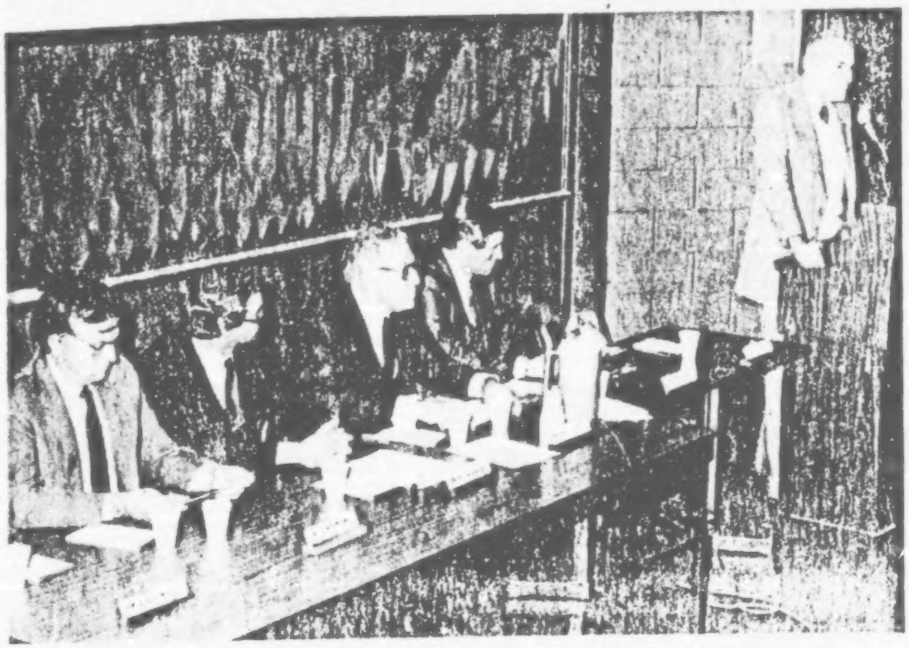
ABRAHAMSON spoke on "High Technology and Training Needs;" Bernard Lashinsky, chief economist for Inland Steel Co., spoke on "Patterns of Industrialization in the Midwest;" Michael Garvey, manager of operations engineering at Travenol Industries presented "New Directions in the Plastics Industry;" and John Lambert, vice president and technical director for Fansteel Corp., presented "High Technology in the Plastics Industry."

The conference was cosponsored by CLC and the Lake County Area Vocational Center.

Hunter told the conference cooperation between all levels of education is essential to serve the future high technology needs of business and industry.

"In my view, it is essential, if we are going to be able to cope with high technology changes, that we work in a partnership," Hunter said.

About 150 people attended the conference, which was the second in a series of economic development conferences sponsored by CLC.



Addresses Technology

College of Lake County (CLC) President John Hunter, far right, addresses the high technology conference at CLC. From left, John Lambert, Michael Garvey, Leonard Abrahamson and Director of Lake County Area Vocational Center Merv Pilotte and Hunter. Also attending was Bernard Lashinsky.

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Microcomputerized Program Adds to LCAVC CBE

A new dimension has been added to the Lake County Area Vocational Center's CBE program thanks to microcomputerized data processing programs that assess an individual's data processing skills and provide information about career choices.

The first series of programs developed by LCAVC instructors Bob Parker, Bob Santner and Jim Sands, were designed to inform a student about the types of jobs available in data entry and the entire field of computer programming. The series also enabled students to become familiar with the duties required of persons in these job areas.

In the microcomputerized program, the type of skill required for data entry work might include having the student actually "key in" information and simulate an accounts payable form on a monitor. In the simulation of computer programming individuals have an opportunity to key in and run a simple BASIC program. According to LCAVC representatives, these experiences enable students to become more aware of the types of jobs available in data entry and computer programming.

The third series of microcomputerized data processing programs were designed to answer the question, "Can a student learn BASIC programming theory and then apply it by actually writing and running a computer program without direct supervision?"

This segment of the program was divided into ten competencies, each of which contained three major components: theory, practical knowledge, and evaluation.

The theory component involved interaction between the microcomputer and the student, using a competency-based learning guide as a reference. The practical aspect included a series of programming exercies written in BASIC language, and evaluation was provided by an objective test administered and graded by the computer.

After completing each portion of the competency, the student received a score from the computer, which then directed him/her to more advanced theory. A student who twice failed any evaluation was directed by the computer to consult the instructor.

According to the program developers, several observations were evident after field testing:

1. Students were highly motivated through their dealings with the microcomputer.

2. Students found the Competency-Based Learning Guides easy to use, even though several guides were modified as a direct result of student comments.

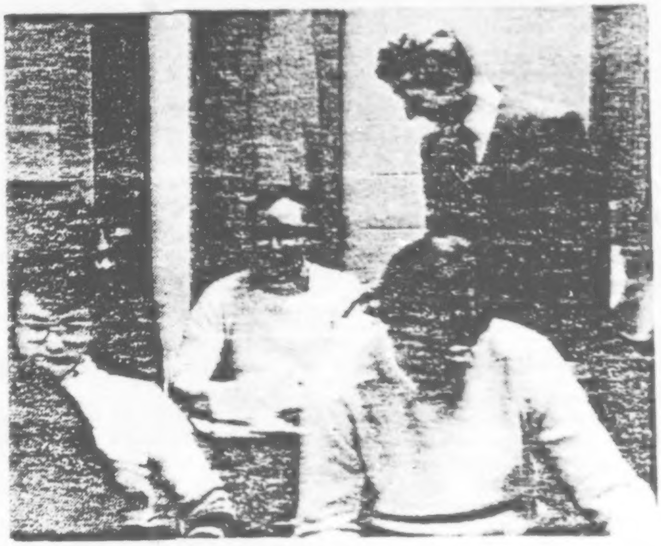
3. It was easy to assess student progress and potential for computer programming success.

Throughout the project, the microcomputer proved to be an excellent educational tool. The computer-based learning delivery system and the Learning Guides which supported them, stimulated student thought and involvment and enabled students to thoroughly explore the data processing career field and determine personal interest and ability.

The microcomputerized data processing project was an Education/CETA Linkage endeavor funded through the State's Special Program Division of the Department of Adult, Voca-

Jan Robinson (seated) and Susan Kuss work on the microcomputerized Individualized Learning System which was recently developed, tested, and evaluated by LCAVC. The microcomputerized data processing program was well-accepted and received high ratings from students involved in initial field tests.

A second series of microcomputerized programs assessed an individual's potential for success. To assess student potential, relatively simple programming concepts were taught. The students were then asked to apply their knowledge by writing and compiling a number of BASIC programs. Not only did this measure student ability to program, but it also tested student interest. Studies quickly showed that if a student failed in this fundamental skill test, he/she would probably not succeed in more advanced programming.



TASKS TAKEN TO TEACHERS

CIVE Project Director Dr. Urban T. Oen supervises the preparation of a task list at a recent workshop held at Wabash Valley College, Mt. Carmel, Ill. Some 65 vocational/technical education teachers attended the workshop, which involved a variety of competency-based instructional techniques and

News-Sun 5/2/84

New computer drafting

Computer-assisted drafting is a new program to be offered at the Lake County Area Vocational Center, beginning in the fall term.

With a CAD system, a drafter uses an electronic digitizing pad and an electronic pen, instead of paper, pencil, T-square, triangle and drafting machines.

The new system reduces the time needed for some projects by as much as seven hours.

Persons pursuing a drafting career need to take two semesters of drafting before the one-semester CAD course. Participants will be taught approximately 250 commands and techniques which can be used later on larger and more complex systems.

THE NEWS-SUN, Tuesday, June 12, 1984

LCAVC medical program gets college affiliation

The Medical Assisting program at the Lake County Area Vocational Center (LCAVC) , Grayslake has recently affiliated with Northwestern University and Dr. Hans Noll, internationally-known cancer researcher in the Department of Molecular Biology.

Selected students have an opportunity to apply skills learned in the Medical Assisting program area as well as becoming involved in basic procedures and techniques related to cancer research at Northwestern University.

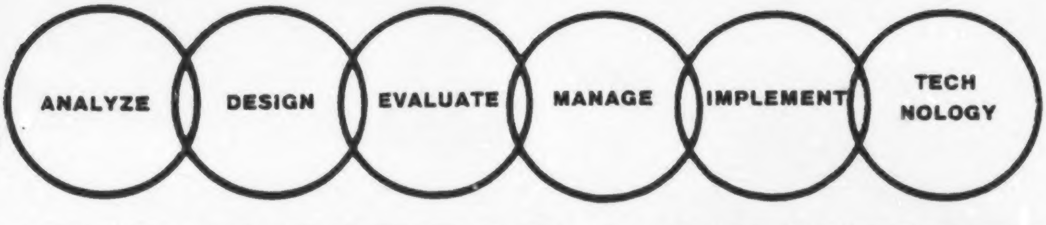
Students involved in the program are Kristen Harrop, Stevenson High School, Prairie View; Kathy Pitts, North Chicago High School, and Georgine Drury, Warren Township High School, Gurnee.

LCAVC has been involved in extended campus activities for students for the past seven years, allowing vocational students time to work with a selected business, industry or instituttion.

The LCAVC Medical Assisting Program has other students who are also participating in other campus sites, including various doctor's offices, county clinics, Lake County Health Department, specialized hospital departments and other clinical facilities.

Congressman Porter Tours LCAVC

Congressman John Porter toured the Lake County Area Vocational Center on Monday, March 15. Accompanying the Congressman were his aide, Jim Young; Merv Pilotte, Director of LCAVC; Dick Glogovsky, Assistant Director; Bob Neal; Chairman of the LCAVC General Advisory Council; and Bill Thompson, ESR Superintendent. Following the tour, Congressman Porter was honored at a luncheon held at the Center. In attendance were the members of the LCAVC Board of Control and representatives of the College of Lake County. Congressman Porter was asked for his views on education in general and vocational education in particular.



MID-AMERICA CONFERENCE
ON COMPETENCY-BASED EDUCATION

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1984

1984 MID-AMERICA CONFERENCE
HIGH TECH-
NOLOGY
COMPETENCY-BASED EDUCATION

TECHNOLOGY AS A TOOL FOR IMPLEMENTING AND MANAGING COMPETENCY-BASED EDUCATION

June 11, 12, and 13, 1984
Arlington Park Hilton Hotel
Arlington Heights, Illinois

Sponsors:

MIDWEST ASSOCIATION for INDIVIDUALIZED INSTRUCTION

THE NATIONAL CENTER FOR RESEARCH IN VOCATIONAL EDUCATION

Illinois
State Board of
Education

East Central
Network for
Curriculum
Coordination

LAKE COUNTY AREA VOCATIONAL CENTER
LCAVC

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9:30 - 10:30 a.m. General Session "Keynote Address"

The Future Role of Technology As A Tool For Implementing and Managing CBE

Roland Pampel, Vice President of Research and Development, Prime Computer, Inc.

Lake Superior Room

10:30 - 10:45 a.m. Break

10:45 - Noon Concurrent Sessions

ANALYZE CBE

I. Identifying the Skills for Illinois' Education for Technology Employment Programs (High Tech)

Dick Glogovsky, Assistant Director, Lake County Area Vocational Center, Tom Erekson, Northern Illinois University, and Gene Strandberg, Eastern Illinois University.

The session will focus on the state-funded project, "Education for Technology Employment", and provide participants with field-based and university-based technical assistance activities. This session will give vocational educators a basic understanding of the procedures used in identifying High Tech skills for integration into existing vocational education programs.

Governor's Room

2. Michigan's Computerized Occupational Data Analysis System

Chris Olson, Project Director, Occupational Data Analysis System

The purpose of this session will be to discuss and demonstrate the Michigan Data Analysis System.

Magnum Room

THE NEWS-SUN, Saturday/Sunday, October 1-2, 1983
Waukegan, Illinois

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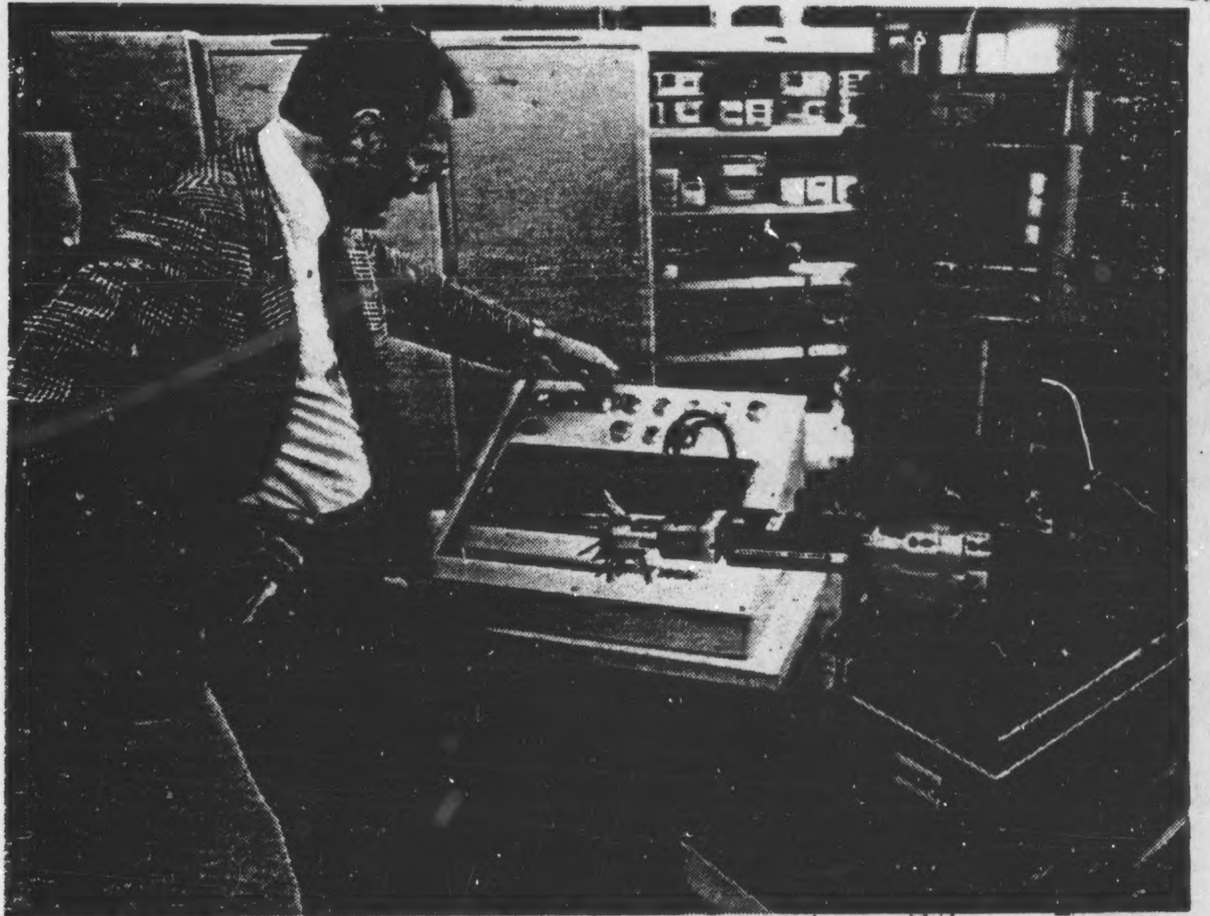

Getting hands on training in robotics and other high technology is just part of the program being developed at the Lake County Area Vocational Center in Grayslake. Richard Glogovsky, assistant director at LCAVC and director of the high technology program, take a look at one of his newest acquisitions, the BRAT 801, a robot with an arm. In this picture the arm's "hand" is holding Glogovsky's key ring.

News-Sun Photo by Jonathan Daniel

County vocational center plans high-tech for preps

By KAREN McINTYRE
Staff Writer

The Lake County Area Vocational Center in Grayslake will help play a key role in developing the course materials that future high school students will use to prepare them for the high technology world of tomorrow.

LCAVC is one of eight secondary school agencies that will be cooperating with Northern Illinois University faculty members in Illinois' long-range curriculum development effort to prepare high school students for a future in high technology.

Under a $1 million state legislative appropriation already approved by Gov. James Thompson, LCAVC along with seven others will be working with NIU faculty to seek ways to give students high-tech skills.

As a result of the appropriation, LCAVC's grant this year is $60,000.

"The grant will allow us to work with the planning and development of high technology at the secondary level," said Richard Glogovsky, LCAVC assistant director and high-technology project director. "We're taking technology program, including robotics for industrial/electrical maintenance, the inclusion of a microcomputer repair system to teach students how to repair microcomputers in the radio/tv repair program and adding computerized numerical controls in the machine shop program.

Recently added to the robotics program was the purchase of a robot used in the industrial/electrical maintenance program. The 4-foot-tall robot has an arm programmed to perform various functions. Students will be learning how to program the robot, Glogovsky said.

LCACV competed with about 60 other schools in applying for the grant.

Other schools involved in the high-technology grant include the Bureau of Practical Arts and Technical Subjects, Chicago; Northern DeKalb County Vocational Education Consortium, DeKalb Unit District; Stephenson County Educational Service Region, Freeport; Will County Educational Service Region, Joliet; Quincy Public School District, Quincy; Marissa Community Unit School District, Red Bud, and Rockford Public School District in

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TV Focuses on Vocational Center

An innovative media production program is helping Lake County Area Vocational Center students prepare for jobs in the growing cable industry while working to promote the offerings of the area center.

Representatives of the U.S. Cable Company of Waukegan, Ill. approached Lake County staff with the suggestion that the media production class produce a series of programs for the cable network. This arrangement enables the students to gain experience in working with the video and sound equipment along with directing and producing the programs.

Ardis Harnagel, vocational coordinator, interviews Merv Pilotte, director, and Dick Glogorsky, assistant director, of the Lake County Area Vocational Center, Grays Lake, Illinois.

The program's format is similar for all areas. Following an introduction to the vocational area and instructor, a discussion is held featuring videotape inserts of the instructional areas and students. Closing discussions center on the future for the area and the placement potential of its students.

Each week these half-hour programs will be aired on community access channels. As a supplement to this project, students are placed in internship programs with cable TV companies.

For further information, contact Ardis K. Harnagel, Vocational Coordinator, Lake County Area Vocational Center, 19525 W. Washington St.,

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LCAVC Instructional System

Richard Glogovsky, Assistant Director.

During the Fall of 1976, the Lake County Area Vocational Center made a careful analysis of the instructional system used at various operating vocational centers located in the Midwest. The results of the analysis indicated that in order to meet individual differences in ability and achievement, the student should be allowed to enter a program at his/her present ability and be able to progress at his/her own rate. It was felt that the learning delivery system had to be based on the acquisition of skills required by employees working in business and industry.

Presently the Vocational Center serves interested Junior and Senior high school students bussed from fifteen high school districts in Lake County and two districts in McHenry County. Because of the diversity of students attending the Center, the instructional system at the Center has been designed to be flexible enough to be able to accept students at any level of ability and allow them to work at their own pace toward a desired goal.

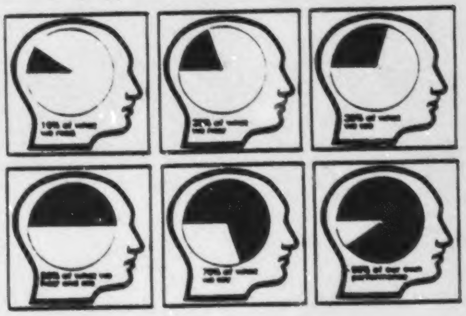
The instructional system utilized at the Lake County Area Vocational Center is individualized for the most part. The vehicle for this system is directed by a Student Learning Guide. An SLG is basically a segment of knowledge which focuses on the acquisition of a skill, task, competency, concept or attitude. In general, learning guides are self instructional, student paced, and self directed which provides for accountability of individualized learning at LCAVC.

Students entering a program are pre-tested to determine entry level. Once ability level has been established, the student proceeds through a series of learning activities required for the acquisition of a particular skill. Student learning guides used at the Center are developed by program instructors. The guides represent specific segments within the curriculum. They state specific performance objectives and allow students to use resource materials, audio/visual aids and become involved with a variety of different learning activities.

Approximately 80% of the activities carried on in each program are classified as hands-on. Emphasis is placed on students participating in actual, or simulated job and/or production situations. As program objectives and individual skills are met, the students continue their progress in learning by moving on to the next sequence of guides within a program. Each guide actually represents an identified task required of a person employed in that field. Upon completion of a guide, students are then evaluated on their performance as set forth in the criterion statement of the terminal performance objective.

When students were asked how they felt about the instructional system, they replied: "I like the individual pace; the student really gets to study each phase thoroughly. I feel like I can spend the time on it without letting something pass me by in the meantime."

Competency based individualized learning is a proven educational technique, and is evidenced by its realistic and practical pedagogical format. Individualized instruction provides that element of accountability which is being stressed so much these days by both business and industry.



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Needless education roadblocks

WHEN THE General Assembly passed, and Gov. James Thompson signed, a bill defining stricter requirements for high school graduation, we doubt very much whether they intended for that bill to adversely affect vocational education programs in the state.

Yet, according to the legislative liaison for the Illinois Vocational Association, some school districts are interpreting the new law so narrowly that they may discourage students from enrolling in vocational education courses. Arbitrarily deciding that only certain courses meet the new requirements can mean such students can't fit vocational training into their schedules if they want to graduate from high school.

Should this happen, it would indeed be unfortunate for both the students and their communities as well. In general, the goal of vocational education has been to provide training for the thousands of high school students who will not get to college. By offering courses in such fields as auto mechanics, child care, data processing, health care, welding, plumbing and electricity, among others, schools give young people the opportunity to learn an occupation to enhance their future livelihood.

At the same time, however, vocational training fills a serious need in our society. It meets the demand for technical services that normal high school and college educational programs do not provide.

Take the auto mechanic as an example. Years ago, when there were few models of cars and when their engineering and design were much simpler, it took little training for someone to become an expert. That has changed today. Electronic engineering, front-wheel drive, new engine designs, for example, have confronted modern-day mechanics with the need to be much better trained if they are going to be able to repair today's complex vehicles. Vocational training at the high school level is where most of tomorrow's mechanics get their start. And the same is true for other trades as well.

The General Assembly was cognizant of this when it mandated stiffer graduation requirements. The new law requires students to complete three years of English, two of math, two of social science, one of science, and one of music, art or foreign language.

But in the areas of math, science and English, the legislature, realizing the need to be flexible, did not specify what actually should constitute such courses. It was exactly with vocational education in mind that flexibility was allowed. Thus, it is permissible for vocational education courses in applied math and applied science, or business math or business English to fulfill graduation requirements.

Unfortunately, as the vocational association liaison noted, many districts may not allow such courses to count toward credits for graduation.

EDUCATORS must not ignore the importance of vocational training for that segment of their students whose aptitude and interests are not entirely inclined toward the academic. The training vocational education provides them is just as important as advanced academic courses are to college-bound youth. No needless obstacles should be placed in the path of those who want to pursue a career in the technical service fields.

LAKE COUNTY AREA VOCATIONAL CENTER

Movable Equipment Bid
February 24, 1984

ITEM #	QTY	DESCRIPTION	MFG. & MODEL NO.	UNIT COST	TOTAL COST
MACHINE SHOP - 73					
73-401	1	Computer Numberic Controlled Lathe as specified			
73-402	1	Mechanical Plotter as specified			
73-403	1	Service Parts Set as specified			
73-404	1 set	Carbide Tooling as specified			
73-405	1	Drill Chuck			
73-406	1	MT 1 Arbor			
73-407	1	3-Jaw Universal Lathe Chuck			
73-408	1	Clamping Disc/Face Plate			
73-409	1	Triple Bearing Live Center			
73-410	1	Std. O.D. Toolholder			
73-411	2	Digital Mini-cassette Tapes			
73-412	1 set	Instructional Courseware as specified			
				TOTAL	
		Alternate			
73-413	1	Video/Interface Package as specified			
73-414	1	CNC Vertical Milling Machine as specified			
73-415	1 set	Basic Accessories for CNC Mill as specified			
73-416	1	3 Axis CNC Programmer/Control System			
73-417	1 set	Instructional Software with Staff Training			
				TOTAL	
		Alternate			
73-418	1	CRT Programming Station as specified			

Illinois
State Board of
Education

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Walter W. Naumer Jr.
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